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Eighteenth Meeting of the Australasian Association for the Advancement of Science.

NOTIFICATION OR PREVENTION?

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To take a textbook on public health of thirty years ago and turn to the remarks on the subject of notification of disease makes interesting reading. In England an *Infectious Diseases Notification Act* had been passed in 1889, which made the more serious infectious diseases notifiable to the local authority, but this act was only adoptive. In 1899 an extension act was passed, which applied to the whole of Great Britain and made notification of these diseases compulsory. During the intervening ten years much debate had been carried on as to whether such notification was justifiable, what diseases should be made notifiable, whether notification should be by householder or medical attendant or both. I was a medical student in the early 'nineties of last century and remember the discussions in my own State. The textbooks reflect the attitude of those times. On the one hand was discussed the question whether compulsory notification by the medical attendant attending the patient was not a breach of professional confidence and therefore unethical; on the other hand whether such notification would not lead to the concealment of disease. The passage of time has shown both these fears to be groundless. The evil consequences of notification arise from quite other causes.

In Australia such quarantinable diseases as small pox, plague and typhus fever had from an early date been notifiable in the different States under the State Quarantine acts. About the end of last century in most of the States clauses were introduced into the public health acts which provided for notification of certain other infectious diseases, notably scarlet fever, diphtheria and typhoid fever. A perusal of these acts reveals how closely the clauses dealing with this matter were modelled on the English act. Puerperal fever or conditions resembling it was also made notifiable in most of the State Acts as in England, but in New South Wales even to the present day only cases occurring in private hospitals are notifiable and no responsibility in this regard rests on the medical man. In

1898 South Australia led the way for Australia and I think for the world in making compulsory the notification of pulmonary tuberculosis by the medical attendant; this course has been followed by most of the other States. An example of the lack of uniformity throughout the Australian States which will be further referred to at a later stage, is shown by the fact that even to the present time notification of this disease is compulsory only in certain parts of New South Wales.[1] On the other hand Western Australia has gone further than other States and for many years has compelled medical practitioners[2] in addition to their notification of cases of pulmonary tuberculosis when first discovered, to furnish to the Health Department an annual return of all patients with tuberculosis of any kind attended by them during the year.

In these different State Acts power was given to the Governor-in-Council to add by proclamation to the list of those notifiable, other diseases than those specified in the act. For instance, measles had been included in the *Public Health Bill* of 1898 in South Australia as it was originally introduced, but had been dropped during the passage of the bill through Parliament owing to a coincident epidemic causing great alarm to local authorities and legislators as to the amount likely to be paid in notification fees. It was added (together with whooping cough) by proclamation in 1908. In the same way through local or national emergencies other diseases have been added from time to time. Some of these additions have been only temporary, as for instance influenza in 1918-1919 when the pandemic was threatening Australia, varicella in 1913 when New South Wales was visited with an epidemic of the mild form of small pox (sometimes known as alastrim). But although temporary in all other States, South Australia has retained these two diseases permanently as notifiable. In the case of certain other diseases the addition has been permanent due to local influences, as for instance dysentery in Western Australia, bilharziosis in Western Australia and South Australia. Lack of uniformity is again shown by the lists of notifiable infectious diseases for the different States. A reference to the table of morbidity statistics for Australia, published in May number of *Health*, will show this, even though the list is not absolutely complete, for example bilharziosis is not included. In no two States is the list of notifiable diseases the same. Of the twenty-seven diseases there listed thirteen are notifiable in every State, namely: Acute anterior poliomyelitis, cerebro-spinal fever, cholera, diphtheria, leprosy, plague, relapsing fever, scarlet fever, tuberculosis, typhoid fever, typhus fever, variola (small pox), yellow fever; four are notifiable in five States, namely, anthrax (all States except New South Wales), *encephalitis lethargica* (all States except South Australia), malaria (all States except New South Wales), puerperal fever (all States except New South Wales); one is notifiable in four States, namely, erysipelas (all States except New South Wales and Victoria); one is notifiable in three States, namely, dysentery (in Victoria, Queensland and Western Australia) and eight are notifiable in only one State, namely, beri beri (in Western Australia), dengue fever (in Western Australia), favus (in South Australia), influenza (in South Australia), measles (in South Australia), tetanus (in Victoria), varicella (in South Australia), whooping cough (in South Australia).

In England the list comprises some twenty-two diseases, including acute primary pneumonia and acute influenzal pneumonia, which are not notifiable here. Measles and German measles were notifiable in 1919, but were withdrawn from the list in 1920.

There seems to be no rule on which a State bases its selection of the diseases to be notified. For instance, one would expect dengue to be notifiable in Queensland and New South Wales. "During the months of February and March there was an extensive epidemic occurrence of dengue fever along the Queensland coast and in New South Wales, extending as far south as Newcastle and inland as far as Toowoomba and Tamworth. Dengue is not a notifiable disease in either of these States and no exact records of prevalence are therefore available."[3] The other diseases notifiable only in one or two States are just as prevalent in the rest of Australia. If notification is an aid to prevention, this lack of uniformity is a striking commentary on the need for a national health organization of some sort to bring about a certain measure of uniformity.

A new principle regarding notification was introduced during the Great War. When it was proposed to include notification among the measures for the better control of venereal disease, there was a recrudescence of the fear that notification of these particular diseases would lead to concealment of cases. As a compromise notification was made impersonal, as long as the medical practitioner was satisfied that patients were continuing treatment. The name and address of the patient are, however, divulged to the central authority administering the act if at any time the patient relinquished attendance for treatment.

From this point the zeal in certain quarters for notification seems to have outstripped any understanding of the limitations of its usefulness. At the venereal diseases conference held early in 1922 a proposal was made for the notification of all pregnancies and compulsory prenatal treatment of expectant mothers. The realization that no facilities for such prenatal treatment on a large scale existed, led to the proposal being hurriedly dropped, but the fact of it being so thoughtlessly made, reveals the unreasonable importance that had become attached to the power of notification.

As a contrast it may be noted that more recently in the report of the Royal Commission on Health the following occurs:

> We consider that no scheme of maternity allowance or motherhood endowment can be regarded as satisfactory which does not attempt to secure adequate care, in conformity with the best medical experience, for the health of mother and child both in the prenatal period and at the time of childbirth. If the

Maternity Allowance Act be continued, we are of opinion that the act should be amended to provide for payment of the allowance only on the conditions that the expectant mother should make application for the benefit at least five months before the date of the expected birth, and that a medical certificate be produced that the mother has had satisfactory prenatal supervision. The granting of maternity benefits could in this way be utilized to secure satisfactory prenatal care and, thereby, a reduction of maternal and infantile mortality and morbidity. Such procedure would involve the provision of increased facilities for prenatal treatment, the necessity for which we have already advocated.

We are of opinion also, that any maternity benefit under a national insurance scheme should be payable only on the conditions we have suggested above regarding the maternity allowance.

Recommendations were made accordingly.

Comyns Berkeley also in an address delivered last year in England[4] urged that maternity benefits under the *National Insurance Act* should be granted only "if the payment of the maternity benefit was made conditional on the woman presenting a certificate to the effect that she had attended an antenatal centre or had been examined by a medical practitioner during the last month of pregnancy." As he says: "We cannot compel; we can only persuade."

It may be noted that both these suggestions differ from that notification of pregnancy which was previously suggested. However difficult they may be of application—and the difficulties are manifest—they put prevention rather than notification in the foreground.

In the realm of industrial hygiene the value of notification of certain diseases incidental to employment has gradually come to be recognized. In America the following occupational diseases are notifiable in certain of the States:[5] arsenic poisoning, brass poisoning, lead poisoning, mercury poisoning, phosphorus poisoning, wood alcohol poisoning, caisson diseases (compressed-air illness) and all occupational diseases are notifiable in nine States.

At the Conference on Industrial Hygiene held in Melbourne in 1924 it was recommended:[6]

> That every State should adopt regulations requiring notification of industrial diseases. The diseases which should be adopted as notifiable are: poisoning by lead, mercury, arsenic, phosphorus, other minerals, benzol or its nitro and amino derivatives (dinitro-benzol, aniline and similar substances), carbon bisulphide, nitrous fumes, carbon monoxide, cyanogen compounds, septic poisoning, chrome ulceration, dermatitis, cancer (occupational), compressed air illness, mining nystagmus, pneumoconiosis, phthisis (miner's), beat hand, beat elbow, beat knee, synovitis (wrist), dermatitis.

So far no State has taken any steps to carry out this recommendation except Western Australia, where provision has been made for such notification in the *Workers' Compensation Act*. It must be noted, however, that as a result of recommendations of the 1922 industrial hygiene conference, the Victorian Government in 1923 made dangerous trades regulations under the *Health Act* of 1919 which introduced notification of occupational illnesses.

The latest suggestion is that medical practitioners should be required from time to time to notify other forms of illness which they might be attending, and that ultimately they should forward returns of all cases of illness coming under their care. The recommendations of the National Health Commission on this point presuppose the existence of whole-time district medical officers of health, which arrangement would overcome many of the evils of notification under the present system. But the very fact that such a suggestion has been made, shows the extent to which notification is coming to be looked upon as an everyday duty of the medical practitioner.

It would thus appear that notification which was a novelty thirty years ago, has in the meantime become a commonplace in administration. It is by many exalted to the foremost place of importance. In textbooks on preventive medicine dealing with the prevention of infectious disease, it is stated that we have at our disposal (i.) notification, (ii.) isolation, (iii.) quarantine, (iv.) disinfection, (v.) laboratory methods, (vi.) immunization.

Sir John Robertson (Medical Officer of Health of Birmingham), in opening a discussion[7] in England this year said: "In the past we have applied four methods in our attempts to limit the spread of these infections, (i.) notification, (ii.) isolation, (iii.) quarantine, (iv.) disinfection. Within recent years we have added immunology both to the prevention of these diseases and to their treatment."

It is evident that isolation and quarantine are not applicable to all infections, such as tuberculosis and syphilis. The question then arises whether notification is always worthy of being given first place as a preventive measure. Sir John Robertson later in his paper says: "There seems to be no doubt that notification of infectious diseases has been of great value. It has drawn attention to many problems which have emerged as the result of investigation into the conditions surrounding each case. While this is so, there are several infections in regard to which notification has as yet achieved nothing."

Consideration of these facts suggests that the time is opportune to review the whole question of notification of disease, to discuss the limitations of its usefulness and to discover, if possible, any changes which might increase its usefulness. What is said is an attempt to recognize the defects of present methods; it is not in any way a criticism of individuals, but of a system.

The question must first be answered: "What is the object of notification of disease?" The answer usually given is that its usefulness is twofold—for statistical purposes and for the better control of disease.

Nonetheless, when giving evidence last year before the National Commission of Health, statisticians showed clearly that they differentiated between "registration" and "notification." The former is regarded by them as useful for statistical purposes and "notification" only for health purposes. When

they were questioned about the confidential notification of causes of death to a district medical officer by the medical attendant, statisticians were almost unanimous that for statistical purposes registration would also be needed. The reality of this distinction is strikingly shown in regard to births. In all States births and deaths are registered purely for statistical purposes. In one or two States a *Notification of Births Act* has been passed as in England, according to which notification, as distinct from registration, is made to a health authority for public health purposes. Similarly "registration" of still-births is usually discussed solely from a statistical point of view. But in England and Wales, although no registration of still-births is compulsory (as by law still-born children are certified as still-born), the birth of a still-born child is "notified" to the medical officer of health for the district.[8]

This distinction between registration and notification is not always clearly recognized in discussion and even in the report of the Royal Commission on Health the distinction is not made clear in the paragraphs devoted to still-births. If it be true, it destroys the supposed usefulness of notification of disease for statistical purposes.

Evidence has been accumulating of recent years to support the contention of statisticians that notification of disease under present conditions is often of no great value from a statistical point of view. For instance, Sir George Newman says:[9]

> Unfortunately notification of tuberculosis still remains incomplete and delayed, partly due to the physician, partly due to the patient. It is clear that the public scheme for dealing with tuberculosis must fail to produce the maximum amount of good unless the cases can be brought under observation at an early stage. At Barnsley it is recorded that 87% of the deaths from tuberculosis occurred in persons who had never been notified or in cases in which notification had been delayed until within six months of death. At Bath of 54 persons certified to have died from tuberculosis, only 35 (65%) appear on the register of notified cases and in nine of these notification was received less than three months before death. At Middlesbrough out of 178 deaths 50 were not notified before death and 53 others were only notified within three months of death.

Under such circumstances notification is as of little use for statistical purposes as it is for prevention. Similarily it is evident from discussions in medical journals in the past few years that both in England and in Australia the number of notifications of puerperal septicæmia is valueless as a criterion of the extent to which puerperal sepsis exists. In impersonal notification, as for venereal disease, the difficulty must be still greater.

If we turn to the part played by present day notification in bringing about better control of the spread of the diseases, we are forced to much the same conclusion.

Amidst the diversity of diseases notified in the different Australian States, let us consider scarlet fever, diphtheria and typhoid fever, which have now been notifiable in all the States for about twenty years. For part of this time puerperal fever has been notifiable in all but one State and pulmonary tuberculosis in all but part of one. The incidence of typhoid fever has fallen steadily in all the States, but it is generally recognized that this is not so much due to notification as to the gradual introduction of better water supplies and improved sanitation, including the recognition of the part played by flies in spreading infection. Diphtheria on the other hand showed a very low prevalence in the first ten years of the present century, a rapidly increasing incidence in every State in the next ten years and a similarly rapid and equally inexplicable fall in incidence in the last two years. Moreover, the variation has not always been synchronous in different States. Scarlet fever has shown the same irregularity and like diphtheria asynchronous variation in different States. Puerperal fever remains constant and unnecessarily high in its incidence in all the States and is relatively low in the State in which it is not notified, when compared with other States where it is notifiable. Since the beginning of the present century pulmonary tuberculosis has fallen least rapidly in the State in which it has been longest notifiable. These facts would show that the rise and fall of the common infectious diseases are quite independent of notification in its present form. Measles is notifiable in South Australia, but the graph which I show of the incidence of nearly 15,000 cases which occurred in the epidemic last year, demonstrates by the regularity of the rise and decline that the spread of the disease was quite uninfluenced.

Turning to venereal diseases, for which in five out of the six States impersonal notification has been the law for some eight to ten years, we learn a similar lesson. The same law of notification prevails for gonorrhœa as for syphilis. Yet witnesses who gave evidence before the Royal Commission on Health were unanimous in every State that gonorrhœa has not decreased in the slightest degree, but that on the other hand syphilis in its primary and secondary stage has decreased considerably in frequency. This was as true for the State where notification does not exist as for others and the reason assigned for the difference between the behaviour of the two diseases was that for syphilis a method of treatment has been discovered and widely applied which quickly terminates infectivity, while no such discovery has been made for gonorrhœa.

It is clear then that notification in its present form at any rate is quite ineffective in controlling these infectious diseases and that the money and efforts spent on it are wasted.

By contrast we learn the same lesson when we turn to other fields of public health than those usually associated with the thought of infectious diseases. One of the greatest advances in public health during the past twenty-five years is the reduction in infantile mortality for Australia as a whole from 112 per 1,000 births in the last five years of last century to 59 for the past five years

and 47 for last year. Yet no part of this reduction is in any way due to the notification of disease. It has been due entirely to a concentrated educational effort regarding the supreme importance first of natural methods of feeding, then of most scrupulous attention to detail in artificial feeding where that is necessary and of regular supervision of the health and habits of baby and mother. Whether this supervision has been done by Government or municipal or voluntary bodies, the results have been much the same, as long as they have been guided and controlled by medical leaders. Moreover, that mortality of the first month of life which in contrast to the mortality of later months has been stationary, has remained untouched because it is due to natal or prenatal influences and our educational efforts have hitherto been largely confined to postnatal conditions. It is true that some authorities have introduced notification of births to assist them in the supervision of infant life or have arranged for nurses to receive copies of registered births, but these have been used as aids to administrative efforts for postnatal care already in existence. It is true also that where such aids are used, death of the infant has occurred in many instances before supervision can begin, because similar administrative measures for prenatal care have not been in existence. Thus the ineffectiveness of notification is again emphasized.

Can we find any reason for this failure?

1. The form for notification of infectious disease originally introduced into the different States was, as in the original English Act what is known as dual notification, by the head of the household (or by his representative) and by the medical attendant. In most of the States it has continued in this form on the statute book to the present day. The idea at the back of dual notification was that it affords a double safeguard against the existence of uncontrolled sources of infection. Events have proved this to be a delusion. In every State dual notification has been for years a dead letter, practically the only notifications made being those by medical practitioners, on receipt of which a form is sent out to the householder with headings for certain particulars to be filled in and returned to the office of the local authority with the householder's signature. This is regarded as complying with the act, but can have very little effect in the prevention of disease. The same holds good for England.

This elimination of lay notification is a tacit acknowledgment of a profound change in thought and outlook during the past quarter of a century. With increasing knowledge it has come to be realized that the recognition of mild or aberrant forms of a particular infection is no easy matter. Diagnosis has ceased to be a matter for the untrained man. The methods of examination have multiplied and have made possible more accurate and earlier diagnosis by the skilled observer and at the same time the medical attendant has become more thoroughly trained to employ these methods. This change of outlook needs to be emphasized, because its recognition over the whole field of notification would do away with many of the evils which exist under the present system. That relegation of notification to the medical attendant only, which has silently taken place, would be followed by the relegation of action to him also.

2. Under present conditions notification although now regarded as the duty only of the medical attendant must be made as a general rule to a lay authority. For the ordinary infections this is the local authority in most of the States. In some cases notification is made both to the local and the central authority, in some to the central authority alone, at the head of which is as a rule a medical practitioner. Even so, however, he is frequently hampered (and especially by the control of his financial vote) by the lay authority. Instances are on record where the lay authority has overruled the desire of the chief medical adminstrator for action, and in New South Wales all action in regard to infant welfare is in the hands of lay authority. During recent years there is evidence of a tendency to introduce the practice of notification being made to medical practitioners. In the *Venereal Diseases Acts* in the different States, for instance, notification is to the Commissioner administering the Act, who is always a medical man. The New South Wales *Health Act* of 1915 ordains the notification of pulmonary tuberculosis to the whole-time medical officer of health in districts where such an office exists. But in Victoria, although whole-time district medical officers are now in existence, notification is still made to the local authority who forwards it to the central authority. It will be found in the last analysis that in most cases the lay authority is the responsible authority for action following notification. It has for long seemed to me an anomaly that this should be the case. No administration would dream of throwing the responsibility for action in architectural or engineering problems in a district on unskilled bodies of men. Yet in the problems of the prevention of damage to the much more intricate mechanism of the human body the careless practice of bygone days continues. In England although notification of industrial diseases is made to the Home Office, notification of infections is made direct to the medical officer of health and the printed form contains a special line for an answer to the question: "Is it desirable to remove to an infectious hospital?"

It must be remembered that the agitation for the notification of infectious disease first arose at a time when health reformers were greatly impressed by the control of epidemics of such diseases as cholera, typhoid and typhus fever in the middle period of last century, which control has been secured by improvements in sanitation. In consequence of this, great enthusiasm for sanitary reform had been aroused. Administrators were also influenced by the developments that were expected as the result of the spread of education, which had become compulsory during the preceding twenty years. These two factors raised the hope that sanitary reform would stamp out all infections and that local authorities would be alive to the opportunities for preventing infectious disease, if they were aware of the presence of infection. The experience of the

subsequent twenty-five years has shown that both these hopes were illusory. On the one hand we have learnt that the spread of many of these ordinary infections and especially of those which attack the upper respiratory tract or the genito-urinary tract, bears no relation to sanitation, but depends on direct contact of infective individuals. Their control is therefore rightly a matter for the medical attendant who deals with these individuals. The improvement in regard to infant mortality and industrial diseases similarly depends on causes in which the local sanitary authority is very little interested. It has also been found that the outlook of the local authority, especially in small townships and country districts, often remains limited to the question of sanitation, and that even in this respect his interest in public health is often subordinate to private or vested interests.

3. The natural consequence of the last fact has been that the central administrative health authority was obliged to compel the local authority to perform his duty by bringing into action the legal machinery which legislation provided. This led to an increasing emphasis on the legal aspect. But the legal outlook is in very many respects different from the ideal public health outlook. The former proceeds along the tedious path of legal procedure, the latter depends for any success on speedy action, prompt to deal with any emergency. The ideal for the prevention of diseases is the ideal of warfare. The legal mind insists on definition, the health administrator must detain suspects. If his knowledge of epidemiology raises suspicions which make the medical officer desire to search, the legal mind inquires, "Where is your search warrant?" Undoubtedly the health administrator must be bound to a certain degree by legal enactments and regulations, otherwise the private liberty of the subject might be in danger at any time from health cranks. But directly the health administrator allows the legal side to outweigh the question of prevention, he loses his initiative. He is content with compliance with the law rather than ever eager to seek fresh worlds of disease to conquer. The truth of this has become painfully evident of recent years. Disheartened by difficulties experienced in overcoming the inertia of local authorities, health administrators whether local or central have often assumed an attitude of too great passivity or have allowed their outlook to become limited to what is required of them by law.

For instance, measles and whooping cough, which are two of the greatest scourges of child life, are notifiable only in South Australia. When the Royal Commission on Health last year was taking evidence amongst other things on the "prevention of the outbreak, development or spread of disease," it was noticeable in those States where these two diseases are not notifiable that directly administrators were questioned concerning them, the reply was made that these were "not legally notifiable." Apparently, therefore, they were not particularly interested in their prevention. This limitation of outlook to legal obligations is bound to react prejudicially on departmental activities. It causes the mind of the administrator to travel in an orbit bounded by legal enactments, instead of him regarding himself as possessed of a roving commission over the whole realm of health. It confines him to administration and hinders him from investigation. Yet investigational work should form a large proportion of the activities of highly placed departmental officers if public health methods are to improve as rapidly as they should. The suggestion that medical practitioners should furnish returns of all forms of illness under their care could become useful only if administrative authorities were enabled to make investigational work a definite part of their activities.

4. Notification to a lay authority has had a similar unfortunate effect on the mind of the average medical practitioner. Administrative measures subsequent to notification are in the hands of the lay authority. In outlying districts this means a sanitary inspector (or as he is now called a health inspector). His emphasis is on terminal disinfection according to the regulations. In our inquiries last year the Royal Commission on Health found that in some country districts it was quite sufficient if the medical attendant provided a certificate that this had been done or was unnecessary. Thus the mind of the medical man slowly becomes content with this also as the full measure of prevention necessary.

On the other hand in more populous districts where more fully trained inspectors or nurses are at work under a local medical administrator, part or whole time, the medical attendant perforce stands aloof after notification, in order to avoid friction with lay authorities. This induces the unfortunate idea that prevention is not his job, but the job of the administrator. It is true that a clause in the Victorian *Health Act*[10] enacts that the medical attendant must "inform the head of the household . . . and any person nursing . . . of the infectious nature of the disease and the precautions to be taken to prevent its conveyance to others." But when one sits down and reflects on this clause, it is rather humorous. The medical attendant is only required to "inform" them! The present position in regard to pulmonary tuberculosis is the most glaring example of the weakness of this policy.

5. Again, the present form of notification to a lay authority involves the practitioner in a legal obligation. And the emphasis on this legal side to which I have referred, affects the practitioner in another way. The legal wrong is failure to notify, not the failure to prevent. Consequently the practitioner's attention is concentrated on the fact of notification. Over and over again I have been rung up by an anxious colleague with an inquiry as to whether such and such a disease is notifiable and could hear through the telephone the sigh of relief with which my negative answer is followed by the comment: "Oh, that's all right then!" This remark exactly expresses his state of mind. His responsibilities end with notification; all his anxieties revolve round that question. This is well illustrated

by a story which was told me last year in a State where the central administration is reputed to be not over active in regard to certain diseases. The practitioner told a man that his wife was ill with an infectious disease which it was his duty as medical attendant, to notify to the authorities. He was immediately met with the remark: "Oh, don't do that; for the health inspector will have to disinfect the premises and he is such a gas bag; he will tell the whole neighbourhood." In his dilemma the practitioner sought advice of a colleague whose reply was: "Oh, that's all right. You are required by law to notify either the local or central authority. Don't notify the local authority and the sanitary inspector will not know anything; notify the central authority and he will not do anything!" Laugh as we may, yet this extreme case reveals how the average practitioner feels that his obligation ends with legal compliance with notification. And this brings countless evils in its train. The evil is seen most conspicuously, I think, in relation to puerperal sepsis. Puerperal fever is notifiable. Directly this is done, all the legal machinery of acts and regulations comes into operation. A private hospital is closed or other steps are taken according to regulations. There is no elasticity in the procedure, although regulations often reflect ideas which are out of date. Treatment of the patient remains in the medical attendant's hands, but control of her surroundings passes out of them. It stands to reason that alike for sake of himself, of the matron of the private maternity hospital and of the patient's peace of mind he puts off notification as long as possible. Particularly is this true if the medical officer of health is a part time officer, a colleague or competitor as the case may be. The attendant flatters himself that the pyrexia is due to constipation or an inflamed breast; if it persists, he sends the patient into a general or obstetric hospital. Then if taxed afterwards with failure to notify he can reply that he had not diagnosed it as sepsis. Discussions that have appeared in *The British Medical Journal* during the past few years show how real and how frequent this difficulty is. Suggestions have been made to notify "puerperal pyrexia," but again the difficulty arises: "What is the definition of pyrexia?" All discussion rages round this question of definitions. Is septicæmia after abortion puerperal septicæmia? If not, at what stage in pregnancy does it become puerperal? The difficulty is as Sir Ewen Maclean says[11] to determine whether notification shall apply to (i.) cases in which diagnosis of puerperal infection may be said to have been established, or (ii.) all cases of sustained puerperal pyrexia.

This difficulty is now so well recognized in England that a special committee of the British Medical Association has been inquiring into it. But so far, although our puerperal mortality in Australia is higher than that of England, no attempt has been made here even to inquire into the difficulty. This again largely arises from our lack of national health outlook or national health organization.

Administrators know these facts and if they are concerned about our puerperal mortality rate, they resent the non-notification of cases, but they are powerless. One administrator told me of a case which he knew had occurred in a private hospital (the matron having told of it for her own protection) yet the medical attendant persisted that death was due to injuries in childbirth.

Practitioners and administrators are thus kept apart by legal machinery, when they should be united by a common interest in prevention. The administrator is conscious of the shortcomings of the practitioner, in his failure to notify, of his apparent lack of interest in measures for prevention of disease and is unconscious often of the difficulties in the way of diagnosis, of the degree to which this apparent lack of interest arises from his non-inclusion in the administrative scheme. The practitioner on the other hand criticizes the administrator for his slowness, his failure to get results "as they did in the army," unconscious in his turn of the administrator's difficulties owing to the curtailment of his sphere of influence and owing to his financial and staff shortcomings. So great has become this impatience that it was found last year that a section of practitioners were refusing to notify cases of certain infections on the ground that no administrative action followed. While no excuse can be offered for such wilful infringement of law, this shows the pass to which matters have come.

How then can we improve matters?

From what has been said it is apparent that notification as a preventive measure has broken down. It would almost appear that more good would be done by scrapping all machinery for notification and concentrating on administration and education, than by the present system of notification without adequate administration. Yet this is simply going to the other extreme. Notification has its part to play in the preventive scheme, but it needs to be set in its right perspective, to be brought up to date with modern requirements and modern knowledge.

There is no doubt that when originally introduced notification was meant to be the signal which set in motion these administrative measures which have for their object the control of disease. But no local authority in Australia and no central authority either is sufficiently provided with staff or equipment or financial resources to carry out the administrative measures necessary according to our modern knowledge. If there is any doubt of this, think for a moment of pulmonary tuberculosis.

The first thing we must do is to face facts and realize how far we have advanced from the conditions prevailing when notification was first put on the statute book. Notification is by letter or by telegram. In the days when first enacted this was the quickest method available. The telephone was hardly in use. As long as the legal aspect is kept in the foreground, some written document is necessary, but with the preventive aspect foremost, the ideal of warfare becomes prominent and everything must be sacrificed to speed in attack. Live bugs get ahead of legal processes. To depend on notifica-

tion by letter today under these circumstances is like a front line observation post sending a message back to his divisional officer by runner rather than by field telephone. This need for speed in dealing effectively with acute disease is another of the arguments for transferring the responsibility for action to the man on the spot, who is the medical attendant. Imagine the time lost in such a person writing to the local authority and waiting for him to instruct his officers to take action, when, if incorporated as part of the administrative machinery, he could take action at once.

In England with regard to infectious diseases it is usual for the practitioner to telephone immediately to the health office so that means to prevent the spread of disease may be undertaken without delay; the formal notification will follow later by post.[13]

The original object of notification was to control infectious cases. But at that time infectiousness in acute diseases was supposed to be coterminous with illness. Nothing was known of temporary or intermittent or persistent carriers in typhoid or diphtheria. The latest Victorian act certainly provides for carriers, but only by deeming every carrier to be suffering from infectious disease, which is manifestly impossible in certain cases. The Queensland act provides for two medical practitioners to certify that typhoid convalescents are not carriers, but apparently makes no payment. The New South Wales act (1921) gives power to make regulations defining carriers.

When we turn to the chronic diseases, our difficulties become all the greater and grow with every increase in knowledge. Pulmonary tuberculosis is notifiable, but at what stage in the light of our present knowledge are we to term a case "pulmonary tuberculosis"? In the primary complex of childhood? In hilum tuberculosis or only in cases where tubercle bacilli have been discovered in the sputum? The New South Wales act specifies the last named condition, but other acts give no definition.[1]

Syphilis is notifiable, but are we to notify all cases of cerebro-spinal syphilis, such as tabes or general paralysis of the insane or all cases of cardio-vascular syphilis, such as aneurysm or specific aortitis?

Notification was originally intended to initiate measures of control when the patient was infectious, but nowadays our control measures begin long before infectiousness has occurred. Our attention has been drawn more and more of late years to the importance of this and especially in relation to those diseases of the respiratory tract in the control of which notification has proved so useless. In pulmonary tuberculosis our whole aim is to prevent the patient reaching the stage in which tubercle bacilli can be found in his sputum. We do not wait now till a case of diphtheria has occurred to immunize possible contacts against infection, but we find out beforehand who are susceptible and immunize them. The same is true of typhoid fever or whooping cough, of tetanus and an increasing number of diseases. The ravages of smallpox in last century were for ever controlled by raising up a generation immunized by compulsory vaccination in infancy and similarly, if Calmette is to be believed, the ravages of tuberculosis in the future will be controlled by vaccination of infants so that a generation may arise immunized against tuberculosis. But this work must necessarily be done by the ordinary medical attendant. If it be objected that it should be put in the hands of administrators, the reply is that our brief experience with toxin-antitoxin immunization for diphtheria shows that parents accept this far more widely for their children when it is done by their family medical attendant than when a strange official is required to do it. The precedent is given in the case of smallpox where practically every medical practitioner has been made a public vaccinator and to that extent is part of the administrative organization. I shall not enlarge on this aspect of the question, as I understand it is dealt with in a subsequent paper.

From what has been said it would seem that, if notification of disease is to be retained, it should comprise at least four or five distinct forms:

1. Notification as at present (except that it should be direct to a medical officer) of acute infectious cases in patients who are ill and under treatment. Such notification would imply that the practitioner is already carrying out such preventive duties as isolation of the patient, concurrent disinfection, immunization of contacts and so forth as prescribed for that particular disease. Necessary instructions to sanitary officers would go from the medical officer of health.

The diseases on this list would include the ordinary acute infections like diphtheria, measles, scarlet fever, typhoid. I think also that advanced or highly infective pulmonary tuberculosis should come under this head.

Such of these infections as are quarantinable, for example, smallpox, would also be notified by telegram to the quarantine office, as prescribed by *Quarantine Act* at present.

2. Notifications of infective conditions in individuals who are not acutely ill and therefore difficult to isolate, for example, carriers of diphtheria, typhoid and the like, also early cases of open tuberculosis, cases of syphilis, gonorrhœa and so forth. This list would also include (unless this were made a separate heading) conditions such as bubonic plague, malaria and other diseases with an intermediate host, in which the individual is acutely ill, but not directly capable of infecting others. It is evident that in all these cases isolation, as carried out in the first class, is either impossible or unnecessary.

3. Notifications which might be called "consultative notifications," which would constitute a call by the practitioner for consultation with the district medical officer with or without a personal visit. This would include any puerperal cases with pyrexia, cases of possible directly infectious disease

where diagnosis was still indefinite, but with definite grounds for suspicion.

4. Notification which might be called "investigational notification," where the call for information and cooperation comes originally from the administrator. This would include such a class of cases as those of "endemic typhus" which we have been seeing in Adelaide for the past nine years and of which an epidemic occurred last year in Toowoomba. It would include your cases of amœbic dysentery in the goldfields. From time to time the administrator might put on this list non-infectious diseases such as goître (under different heads, such as colloid goître, adenomatous goître, exophthalmic goître), organic diseases of the heart, diabetes and similar conditions. It would include all cases of death and still birth and births. Some industrial diseases might come under this heading and some under the second heading.

For such additional duties whether preventive or investigational, the practitioner would, of course, be paid fees according to a prescribed list.

Such a scheme implies, of course, a close relationship between medical practitioners and the whole-time medical officer of health for the district. A good deal of misunderstanding exists at present on this latter scheme. Because it has been necessary to talk of the future ideal and visualize a time when a whole State would be cut up into health districts, it has been thought that it is proposed to introduce this to the same degree at once in all States. That, of course, would be both impossible, because of the absence of trained staff, and unnecessary, because in districts with a very scattered population it would be unworkable. One has only to think of bishoprics in religious work to see how this difficulty would gradually right itself. But that is a subject for another address.

Consideration of the whole system of administration reveals the fallacy that has underlain our activities. Although most of us recognize today that every disease must be attacked in a somewhat different way, this has never been embodied in our legislation. The introduction of notification as a new feature just at the time when success was being attained in certain departments of preventive medicine, obscured our vision. Successes were put down to the operation of notification which were really due to other factors. While we recognize that each disease is a problem in itself, there are certain broad distinctions to be drawn. There is a class of disease in the prevention of which improvements in sanitation have played and will continue to play a large part. This is especially true of disease of the alimentary tract which are food or water borne. But here the legislation and organization necessary to bring about improvements in sanitation were already in operation when notification was introduced. They have preceded and accompanied it and notification has been of service in pointing out weak spots in the line of attack. Similarly, in occupational diseases the movement for control of the workers' environment and for supervision of the worker himself has been operating for years, receiving a tremendous fillip during munition work in the war. And notification of industrial diseases, as now proposed, here plays its proper part as an addition to the organization, again pointing to weak spots in the attack. A step removed is the campaign against venereal disease, where the two methods of control were introduced simultaneously, namely administrative facilities for the removal of infectiousness and impersonal notification. The latter has proved only an adjunct, a very poor adjunct, to the former. But with other diseases we have started at the other end. For years we have employed notification as our chief weapon of attack on puerperal sepsis. But the application of the same principle that has just been outlined, should have led us years ago to concentrate on attention to the training of obstetric attendants and attention to obstetric environment from the beginning of pregnancy, with notification as an adjuvant. Similarly in the respiratory infections, whether acute or chronic, in which our attack hitherto has been so lamentably ineffective, we need to realize the need for a change of method in pursuance of this same principle. The main attack here must be by the constant search for and supervision of infective individuals, whether about to be ill, already ill or formerly ill and the immunization of susceptibles. With this as the main method, notification becomes secondary and adjuvant, as with those diseases where our attack has been successful. But that work can only be gradual and persuasive, as evidenced years ago by Bernard Shaw's preface to "The Doctor's Dilemma." Consequently it must remain in the hands of the medical attendant, with the supervisional cooperation of the whole-time public health expert, who should be available to the medical attendant just as the ophthalmic or bacteriological or radiological expert. In so far as the work of the sanitary or nursing inspector affects personal relationship to his patient, for example isolation and disinfection, it would be transferred to the practitioner and be his responsibility. Such officials and he would have their respective spheres of action, each operating under the public health expert. In the days when medical students had no special training in public health, our present procedure may have been unavoidable. But now that every medical graduate has a thorough training, as part of his course, in the elements of the principles and methods of prevention, for an authority or a Government to keep this large body of trained men confined merely to the notification of disease is as great a crime as it would be in a war to maintain all trained military officers as censors or intelligence officers. The medical practitioner must insist that his proper rôle is not notification, but prevention.

References.

(1) *Public Health Act*, 1915 (New South Wales), Number 7, Sections 9 and 10.
(2) *Public Health Act*, 1911 (Western Australia), Number 34, Section 237.
(3) *Health*, May, 1926, page 92.
(4) Comyns Berkeley: "Save the Women and Children," *The British Medical Journal*, January 2, 1926, page 4.

(5) M. J. Rosenau: "Preventive Medicine and Hygiene," Fourth Edition, page 1244.
(6) Official Year Book of the Commonwealth, Number 18, 1925, page 538.
(7) Sir John Robertson: "Discussion on the Modern Control of Infectious Diseases," *The Proceedings of the Royal Society of Medicine*, May, 1926, Volume XXX., Number 7, Section of Medicine, page 10.
(8) League of Nations Statistical Handbook, Series Number 3, page 45.
(9) Annual Report, British Ministry of Health, 1921, page 63.
(10) *Health Act*, 1919 (Victoria), Part VI., Section 117 (1) (*b*).
(11) Sir Ewen Maclean: "Puerperal Mortality," *The British Medical Journal*, March 13, 1926, page 469.
(12) Hewlett and Nankivell: "The Principles of Preventive Medicine," 1921, page 18.

THE MEDICAL PRACTITIONER'S RESPONSIBILITY FOR PREVENTING DISEASE.

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THE attitude of the medical profession towards the question of the practitioner's responsibility for preventing disease has shown an interesting change during the last forty years. In 1887, Dr. (afterwards Sir Edward) Stirling at the first Intercolonial Medical Congress opened his address on "The State, the Practitioner and the Public" in this way:

> From time to time during the last few years we have witnessed both in Great Britain and the Australian colonies strenuous efforts made by various medical associations to induce the legislature to undertake a greater control over certain matters in which the medical profession is peculiarly interested. Though to some extent the contentions of the profession have been admitted and its recommendations carried into effect, it is notorious that there are still many points on which medical practitioners think, that as a body they have neither received the consideration they deserve nor as the apostles of public health that their recommendations have been so frequently recognized as in their opinion should have been the case . . . . .
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> Under the last South Australian *Public Health Act* of 1884 the members of the medical profession are under penalty required to report the existence of certain infectious diseases (smallpox, cholera, plague and yellow fever) so that precautionary and remedial measures may be at once taken . . . . . In this respect, I think, the attitude of the medical profession has not been quite consistent with their position as the guardians of public health. There is in the minds of many medical men a tendency—a very creditable tendency in some ways, no doubt, but, I think, an unwise one—to see only in such enactments a disruption of the confidential relations between practitioner and patient. I do not think such relations would be in the least disturbed or even strained by the notification of this class of disease.

With this statement may be compared the review of the position in 1923 by Sir George Syme who in his presidential address before the first session of the Australasian Medical Congress (British Medical Association) said:

> The medical profession all the world over has ever been in the forefront of all movements for the prevention of disease, most of which have been originated and inspired by its members. It is true that the ordinary general practitioner in the past has been more directly concerned with the treatment of actual disease than with its prevention, but that is because disease has always been present and required treatment and curative work has necessarily taken up the largest proportion of the time and energy of the ordinary practitioner. It is for this work that he had to be trained. In all occupations specialization has been necessary, because no one individual can be master of every department. The prevention of disease has been made a special department of medicine, in charge of members of the profession who give their whole time to their duties, as officials of the public service. The field of specialization is ever widening and more and more medical practitioners are enlisting in community service, either as whole-time or part-time public officers. Every conscientious practitioner does help in the prevention of disease as far as opportunity offers. It is, however, true that in the past general practitioners might have had more training in the preventive aspects of medicine, might have cooperated more satisfactorily with the public health officials and might have adopted a more sympathetic attitude to their work.
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> In July, 1919, the Federal Committee of the British Medical Association in Australia resolved: "That a material advance will have been made in the practice of public health when the practising profession, who come first into relationship with cases of illness and who can earliest take adequate measures, have become incorporated as an integral part of the machinery of public health." The Federal Committee has indicated the views of the profession on the subject and is engaged in preparing suggestions for the necessary organization. It should be the function of department experts to devise the machinery. The profession will consider most sympathetically any scheme that is proposed.

There is an interesting contrast between the disinclination of the medical profession in 1887 to report cases of smallpox, cholera, plague and yellow fever and the unanimous opinion of the profession in Australia, expressed through its Federal Committee, that the incorporation of the practising profession as an integral part of the machinery of public health will represent a material advance.

The declaration of such an ideal and its expression in practical working terms are by no means the same thing. There will be needed much serious discussion of proposals advanced from all sources of responsible opinion; there will be inevitably much honest difference of opinion, and in any event the development of the idea into a practical code of action will be gradual and evolutionary.

Sir George Syme said that it is the function of the departmental experts to devise the machinery. This is not, however the whole of the truth. The prevention of disease will not become a national purpose until the whole medical profession is engaged upon it and intently committed to it. The medical profession consists of general practitioners and specialists in various branches. Each individual, whether practitioner or specialist, has a part of equal responsibility, none having less than another. The public health specialist has his work; he must study the behaviour of disease in the nation as the practitioner studies it in the individual; but the others also have their work; the ophthalmic specialist must concern himself with reducing the total economic inefficiency of the nation by wise measures to prevent the development of defective vision; the obstetrician has already recognized his special problem in the excessive maternal mortality and morbidity which disfigure our national statistics; the pædiatrist has even now removed some of the

mute reproach of our infantile mortality figures, but he has made no reduction in the numbers of those infants who, doomed to die within their first month, are as far as their hope of life is concerned, born already dead. The surgeons who take the nasopharyngeal tract as their field have realized the magnitude of the total sickness and of the indirect mortality due to infections of this area and see the vision of a healthier nation if various means of prevention can be established and adopted.

In all fields of medical science opportunities to prevent the occurrence or the spread of disease present themselves.

The public health specialist may, as Sir George Syme said, "devise the machinery," but it is not sufficient "for the medical profession to consider most sympathetically any scheme that is proposed." The profession as a whole must "devise the machinery"; nothing less will be successful. The public health specialist can examine suggestions in the light of his special knowledge; he can also translate proposals into administrative form; but he can make little real progress until the concept of preventing disease permeates the daily routine of every medical practitioner and specialist.

We must all acknowledge our duty to examine this question closely in order that we may agree upon the practical course to be followed.

In practical terms there are three main aspects of the question. As an artificial grouping we may discuss disease as either infectious or non-infectious. Disease of either kind may be affected or determined by conditions of man's environment. Gross insanitary conditions are universally accepted as being prejudicial to health; other defects of the environment such as defective lighting, occupational strains and the like, cause departures from normal health of various kinds and degrees.

In respect of these matters the medical practitioner cannot play a large part. If he charges himself with the duty of bringing under the notice of the responsible officials such gross or recognizable defects in the environment of his patients as he considers should be rectified, that is all that can in this field be expected of him.

In connexion with infectious diseases there is a very large field of activity already open to and waiting for the general practitioner. The perspective in relation to infectious diseases has become badly confused. The general public, the practising profession and, I fear also we public health specialists ourselves allow ourselves to fall victims to each new "test" or "immunization" or "theory." This appears to be a "novelty bargain" age in which the acceptability of knowledge is governed by its newness and the cheapness of mental effort necessary to its acquisition.

Many will remember the period, twenty years or more ago, when the "carrier case" was first recognized as a factor in epidemics. The discovery of a "carrier" somewhere within the limits of an epidemic focus was hailed with a kind of relief and often with great publicity, as the solution of that particular epidemic. In fact, the "carrier" is not the solution of the epidemic problem; he merely is the focus of the problem. He is not always so much as that and his control presents an entirely new problem. So, now, the Schick test and toxin-antitoxin immunization are being greeted with applause. In America during my recent visit the *New York Times* announced in striking headlines: "No more diphtheria in New York in 1930." I am convinced that the solution of diphtheria control does not lie in wholesale immunization as it is now practised, any more than it does in the discovery of carriers.

Topley has recently published the results of some remarkable work upon the application of scientific experimental methods for the elucidation of the principles underlying the epidemic occurrence of disease. His articles should be read completely to get their full meaning; but he feels justified in making two important statements. The first of these relates to carriers:

> In most diseases and in all cases in which we are concerned with an endemic infection widely distributed among a large, uncontrolled population, the detection and isolation of carriers has been shown to be impracticable.

Referring to immunization he says:

> It would seem that our best hope of controlling these infectious diseases which refuse to yield to those means of general sanitation which are compatible with the modern organization of our social life, lies in devising some effective means of immunization and so raising the average level of herd-resistance. We have seen reason to believe that the efficacy of such methods may vary greatly according to the period of the epidemic process at which they are applied. If the best method of immunization at our disposal will yield only a slight increase in the average herd-resistance, it may make all the difference whether such immunization be applied early or late in the spread of infection. We cannot envisage with equanimity the immunization of the whole of mankind to all the infectious ills which flesh is heir to.

However possible may be successful immunization of any considerable majority of the population at risk and nothing less is worth discussing in congested or circumscribed populations, it is in Australia a question of staff and money on a scale that public opinion would not sanction. Moreover, I suggest that possibilities of very successful measures on a less extensive scale have not been sufficiently considered. In the case of diphtheria, for example, there is much evidence to show that in the rural districts at least the infective carrier is found generally to be either a convalescent from diphtheria, a mild unrecognized diphtheria (accepted as a sore throat) in the same family or a close contact—generally a family contact—of a patient with clinical diphtheria. The first step is the examination of this aspect and this is the duty of the public health administration. Then, if it be found that the above represents the actual position, it clearly comes within the practice of the attendant physician to discover the carrier and to notify the authorities. This is a simple and logical extension of his ordinary routine as a physician. It is also quite practicable for the physician to perform the Schick test on all members of the invaded family and to immunize the susceptible members. I venture to suggest that if this were done by all general practitioners, a long step forward to the control of

diphtheria in country districts at least would be taken.

The examples might be multiplied, but this will serve as an illustration of what the general practitioner can do to assist in the prevention of infectious diseases. Under Australian conditions this offers a more practicable and more logical method of action than mass examination for carriers or mass immunization.

In the third sphere, the prevention of non-infectious diseases, the possibilities are literally unlimited. The practitioner, whether general practitioner or specialist, has occasions for observing recording and acting with every individual consultation. Is a case of myocarditis in an adolescent related to a previous attack of diphtheria, or an established nephritis to an attack of scarlet fever? Does the early discharge of a convalescent from hospital prevent under any conditions a complete return to health? Are there any early signs in a family contact of an open tuberculosis which should warn the physician of a developing tuberculosis? Is there any indication that the constant use of tinned foods in the back country produces in any constant way minor deviations from normal health which should be investigated?

Such questions might be stated almost without end. They illustrate the way in which the general practitioner can be constantly on the alert to increase our knowledge of disease and to aid in its prevention.

More definite, however, are the directions in which knowledge already available can be applied to anticipate and avoid complications, infections or death.

A very excellent discussion of such possibilities may be found in an article by Munro Kerr in *The British Medical Journal* of June 12, 1926, on "Preventive Medicine as Applied to Obstetrics." Kerr quotes the recommendation of the General Medical Council which came into force in January, 1923, as follows:

> That throughout the whole period of study the attention of the student should be directed by his teachers to the importance of the preventive aspects of medicine.

He proceeds to discuss the application of this principle to the common complications of pregnancy and parturition which are preventible. He makes an interesting and almost revolutionary suggestion to the effect that all obstetric work should be removed from the general practitioner and be provided for by the establishment of an obstetric or maternity service staffed by whole-time specialists, on similar lines to the present school medical service.

It may be that this system would suit conditions in Scotland. I do not know. But it is self-evident that it would not be worthy of serious discussion in Australia. It rests with the general practitioner whether the rate of maternal mortality and morbidity in this country does or does not improve.

I have said enough to indicate the general idea and have by illustration suggested the lines which will inevitably be followed in interpreting that idea. The whole resources of the medical profession will be required and as each member will ultimately be concerned, each member should be giving thought to the question: "How can the practising profession best assist in a national plan for preventing disease and death?"

As I began by quoting the words of two of our distinguished leaders, I will conclude by quoting another. Sir Harry Allen, in his presidential address before Congress in 1908, brought a magnificent address to a close with this inspiring note: "The medical profession owes to the public a service of thought as well as a service of action. We shall not fail in the service of action. Let us see that we fail not in the service of thought."

HEALTH EDUCATION AND THE DEVELOPMENT OF A PUBLIC HEALTH SENSE.

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THE subject I have chosen for my address is "Health Education and the Development of a Public Health Sense." Since preventive medicine has become a specialized branch of medical work and since special officers have been trained and appointed to deal with what is called preventible disease, it has become evident that individuals and communities can themselves do a great deal towards preventing certain diseases arising and to limit the extent of their ravages when they have arisen.

Further, whereas it was first thought that this individual and communal control of disease applied only in the case of the communicable diseases, we now realize that it extends to almost all the ills to which the flesh is heir.

In order that this control may be possible, however, and in order that definite results may be attained, it is necessary that every individual in a community have knowledge of certain means whereby disease is to be prevented.

Now whereas in regard to some diseases it is only the individual who suffers from ignorance or neglect, in many his dereliction of duty may involve others in disaster, whilst from another point of view, even though the individual alone suffer from disease, his incapacity may render him a burden or a financial responsibility to be shouldered by the community. It is clear, then, that each individual has a responsibility to maintain health and fitness in the interests not only of himself, but of the community of which he is a unit.

Now just as there has been necessary careful study and research by specially trained officers to discover the causes of disease and expound methods of prevention or alleviation, so there exists the need whereby so much of the knowledge, as is necessary, may be communicated to the individuals of the community, for without the cooperation of each unit there will be weak links in the chain of prevention.

From research and experience there have issued certain fundamental principles which must be followed that the best results may be attained or in other words the people must be educated in the principles of hygiene and the methods of applying them in practice.

You may say: "Well, this is no new fact and have we not been educating the public for many years in this very way? Have we not given lectures, taught hygiene in schools, presented health films and have not the infectious disease rate and the infantile mortality rate fallen all over the world as a result?"

I admit that that is perfectly correct, but I say also that our progress in this direction lags far behind the progress in the science of prevention; that results are appallingly slow and that the ignorance of the general public in regard to even the simplest principles of hygiene is still colossal or that, if we have succeeded in imparting the knowledge, we have not succeeded in persuading the great majority of individuals to apply it.

I will even go so far as to say that, were most to attain their ordinary education at the same pace as they appear to learn these principles governing health, they would still be in the *Kindergarten* at the age of sixty.

Let us shortly review the present position of knowledge and practice in this regard, for convenience passing through, shall we say, the great Shakespeare's seven ages and let me show that if we have taught the principles, the individual does not apply them.

"First the Babe" *et cetera,* but let me say that in the stage of the babe I do not hold the individual responsible, though I cannot hold his parents blameless, for whereas he is born with instinct or sense to eat or rather drink, undoubtedly inherited from his parents, he has a congenital ignorance of the principles I am discussing; moreover, he seems rather to have a natural tendency to do the wrong thing in that connexion. Had his parent developed in himself a public health sense or instinct, is it not possible that the babe would have been born with one and have given evidence of such a possession even in infancy?

As matters stand, however, how does he betray his total lack of such a sense? In his cradle and very early in his career he sucks, chews and swallows whatever comes within reach, be it dirty, dangerous or not. He watches with evident pleasure the antics of the fly in its endeavour to foul his food or lips, whilst I need not go in detail into his conceptions of sanitation.

When he crawls, he finds greatest delight in the filthiest playgrounds, whilst he craves for boot polish, rat poison, matches or any other disfiguring or destructive agent he can find and strangely enough frequently succeeds in finding them.

"Then the Schoolboy" *et cetera;* the schoolboy delights in unripe fruit and incidentally much prefers the stolen article. He loves to wallow in the muddiest water he can find, prefers to play about latrines and to drink from surface drains through a straw taken from a filthy stable floor.

He never wants to go to bed, though sleep is so necessary to him, whilst the breaking of nuts with his teeth and the chewing of paper, string, grass or other *débris* from whatsoever source, are numbered amongst his hourly occupations.

He delights in throwing rubbish down a well, whilst the breaking off of lids and trapdoors from privies so that flies may enter, gives him the keenest delight.

He bites his nails and sucks his fingers after using them for digging in filth and he fondles cats and dogs regardless of the condition of their skin or the denizens of their fur.

He shuns soap as the plague and invariably leaves the bathroom without cleaning his teeth. Truly is he born to do the wrong thing and indeed it seems to be in the nature of him so to do.

"Then the Lover" *et cetera* who should have reached years of discretion, basking in the smiles of his heart's desire, engages in frequent osculation with lips often the exit gateway of a germ incubator. What cares he of pneumococci, streptococci, diphtheria bacilli *et cetera* and all those menacing parasites, that perchance frequent the rosiest lips? There is no thought of gargle, throat paint or inhalation before this insanitary proceeding is entered upon. He and she, scorning the elements, sit upon damp ground, keep late hours, eat chocolates to great excess and finally enter the bonds of holy matrimony without a health certificate. What is eugenics to love? But as a sun-spot to the sun.

And when their baby comes it also is kissed upon the lips by parents, aunts, grandmothers, family friends and even casual acquaintances with the same unconcern.

"Then the Soldier" *et cetera* and here let us include the average householder and his wife.

They, too, married without a health certificate. He lived as his father before him, he "sowed his wild oats," he was taught none of the truths a young man should know or if he was, disregarded them. As a result, his wife is a chronic invalid and their innocent child pays the penalty. The mother knows not or heeds not the principles of correct feeding. The child already perhaps with a poor start in life is underfed, overfed or wrongly fed. It becomes ill. It is not taken to a doctor early, but relations or neighbours are consulted and the advice of each followed in turn. The milk upon the table is uncovered, flies crawl about the butter, the jam and the milk jug unheeded. Those flies bred in the stable manure at the bottom of the yard where it is heaped and uncovered and on their way to the kitchen they visited the uncovered rubbish bin where putrid scraps lie rotting in moist filth and the privy where there is neither trap-door, lid nor deodorant. Is it any wonder that the child is attacked by enteritis and swells the number of preventible deaths?

I do not suggest that every household is run on these lines, but a sanitary survey of any street will disclose many or all of these evidences of ignorance, carelessness or callousness. What is the effect of such an example upon the impressionable child, if

he survive? Can he develope a health conscience? Can he carry on the message of health? Rather will he spread amongst his fellows ignorance and disease.

"Then the Justice" *et cetera* and here let me say that I do not include all justices nor all persons of mature age, but an undue number of them.

He lacks exercise, he overeats, overdrinks and oversmokes. The hobnails upon his liver perchance outnumber those upon his boots. His waistcoat speaks eloquently of lack of movement and excess of nourishment. Sleep claims him upon every possible occasion, not the calm, regenerating sleep that fatigued muscles and tired brain engender, but the noisy, uneasy, swine-like sleep of the gorged. What cares he for temperance in all things? When does he read pamphlets on diet or listen to the words of wisdom that fall from the lips of the local health officer? Indeed are they pearls before swine.

In the last two stages "of this strange eventful history" we see perchance the survival of some who have survived as a result of their own efforts and of others who have lived in spite of gross breaches of all the laws of health. But it is probable that the comfort of their declining years is a measure of their allegiance to those laws throughout the earlier stages of life. But true it is, that for the most part through all the stages or ages of man's life the laws of health are the least heeded, because they do not pander to our cravings, our likes and lusts, but rather put upon us some restraint and man hates restraint.

The number of persons prepared to exercise some restraint for the good of their health and the health of their offspring is, however, fairly large and is probably increasing, but for the most part they lack knowledge, yet will not put themselves out much to attain it.

If facts are pushed before them, they wake up temporarily and take notice, but tend to forget readily and fall back into ignorance. Our literature, pushed under their noses, is casually read and thrown away. Our lectures are attended by the few and for the most part by those already so instructed in the subject as not to need them. Our lantern slides are viewed out of curiosity and if amusing are appreciated for the laugh they invoke rather than for the message they convey. And so much of our time is wasted.

It is all so temporary in its effect and so casual and infrequent in its presentation. It does not arouse permanent interest nor retention. In other words it doesn't stick.

For a subject to be learned well, for a game to be played well constant repetition and practice are necessary to make the facts or principles stick and the intelligence absorb. And yet the actual sum total of the information which we desire that everyone should have and put into practice, is not really great.

It is a small subject by comparison with the enormous results which may arise from the knowledge of it, at least so far as the ordinary citizen is concerned; for to a large extent details can be left to him who is specially trained and employed to deal with disease when it arises.

Let me shortly review this important curriculum and state shortly what it is we want the public to know. I will tabulate it:

1. The mother should know how to take care of herself whilst her baby is coming and know what signs indicate a departure from normal necessitating medical advice.

2. She should know how to care for and best feed her offspring when it comes and again be able to recognize departures from normal which necessitate medical advice.

3. She should know sufficient of the value of foodstuffs to be able to feed her family to the best advantage.

4. All should know that food and drink may become contaminated and unfit for consumption by exposure to dust and flies.

5. That food, especially such food as milk, is best kept cool in order that the growth of inevitable bacteria thereon or therein may not occur unduly.

6. That utensils used in connexion with foods should be at all times so cleansed as to insure the minimum presence of germs of contamination.

7. That insects such as flies, which breed and feed upon filth and which subsequently may transfer their attention to food, must be given no opportunities for breeding and no unnecessary smells to attract them.

8. That for this reason food scraps, refuse and stable manure should be kept in covered receptacles and privies should be kept clean and as far as possible fly-proof.

9. That these same precautions will starve out rats, potential carriers of disease.

10. That mosquitoes carry certain diseases. That they breed in stagnant water in which they can be killed by the application of a film of oil to the surface and that mosquito nets will exclude the adult insect from both sick and well.

11. That persons suffering from an infectious disease may by the simple acts of speaking, coughing or spitting infect others and should, therefore, be isolated.

12. That in certain diseases, notably enteric fever, dysentery and cholera, the germs of the disease leave the body mainly by the bowel discharge or urine and may be carried about by wind, flies, water *et cetera* and should, therefore, be properly disposed of and rendered innocuous.

13. That the removal of the air in a room is necessary frequently because it becomes altered by the products of respiration and that, therefore, ventilation is necessary to the extent that we breathe fresh air all the time.

14. That teeth require regular cleansing, exercise and proper food, otherwise they become germ infected, carious and incompetent and affect the general health deleteriously.

15. That certain occupations are more deleterious to health than others and that in these the appropriate precautions should be taken to minimize the danger.

16. That cancer, detected and removed early, frequently does not recur and that moles, warts *et cetera* are often the starting point of malignant disease and are best removed before they become malignant.

Perhaps I have overlooked a few subjects, but these in the main make up the sum total of what we require the people to know. And yet, after all these years of our present methods of imparting the knowledge, what do we find on any casual inspection route even in what may be regarded as average and respectable homes? We find:

1. The windows all closed because someone has a cold.

2. Food uncovered on the table because it is such a nuisance to remove a piece of muslin.

3. A fly-proof door perhaps, but propped open so that the cat and dog can get in and out, incidentally the dog scratching itself under the dining-room table and the cat lying on a bed.

4. Waste water and slops thrown out on to the surface of the yard because the drain is blocked and besides it helps to keep the dust down.

5. The well uncovered and the surrounding ground tramped to mud, because it is the best place to do the washing.

6. Scraps of food either upon the surface of the yard (the dog must have taken it there) or exposed in an uncovered kerosene tin.

7. Privy without lid to seat, trap-door or deodorant.

8. The baby of two or three months smothered in flies, sucking biscuits to its heart's content.

And so on. You know all about it, for it occurs in your own homes just because it hasn't become second nature to do otherwise.

We have not a health conscience, a health sense. Hygienic principles have not been drummed into us from our earliest years as "twice one is two" was.

We do not forget that twice one is two and in later life we do not neglect to apply the fact especially if our pocket is affected, then why forget when health is at stake? Should we find a mistake in the milkman's account to our disadvantage, would we not rush to correct it? Undoubtedly yes; but how many of us rush to cover the milk to keep out that fly which hovers over it; yet wealth in the form of health is at stake.

Now I have just endeavoured to put the subject of hygiene, so far as the general public needs to know it, in a nutshell.

The principles are not difficult to present and there are not too many of them for an ordinary intelligence to assimilate. The facts are capable of being presented attractively and interestingly and yet after all these years we have apparently succeeded in communicating them to or sufficiently impressing them upon only the few. Why this failure? I suggest that it is because we approach the subject in the wrong way, in that we endeavour to teach it as we would a science, academically, instead of trying to develope it as a sense, the public health sense or conscience if you like, a sense of right and healthful communal and individual living.

Although it is the most important thing in our lives and our education, we make it a side line, a side issue. We have been trying to teach a subject which offers no direct financial gain in the same way as we teach a profession or other calling which is to provide the means of livelihood, nor is health reckoned in terms of pounds, shillings and pence. Consequently the subject is one of passing casual concern, is not regarded as of equal importance and is not approached by the individual as other learning is approached. It is in fact rather a hobby to the few which to the many holds out insufficient material attraction ever to be acquired by strenuous study or conscious effort when so many more alluring prospects offer.

I do not deny that there are those who study and follow the principles of hygiene seriously for its own sake, but these are in the insignificant minority. It is the masses, however, that we desire to instruct and if they will not acquire the knowledge by conscious effort, can we not lead them to acquire it by unconscious effort, by the gradual unconscious development of a health sense? How may this be done? Obviously, to be developed at all a sense must originate with first impressions very early in life, for in speaking of a health sense I cannot altogether make comparison with what are known as the special senses; these are already present at birth and need but impressions to wake them to activity.

I must rather take as my prototype the sense which leads to the acquirement of knowledge and which in earliest infancy begins in observation by the special senses, such as seeing and hearing and follows imitation, repetition, memory—reasoning and association.

Had parents this public health sense and knowledge so developed from infancy, they would unwittingly develope it in their offspring along with the awakening of the special senses, for the same imitation, repetition, observation and association would opportunely be turned to good account in the arousing and developing of the public health sense or conscience.

The imitative infant, watching its mother convey food to the mouth by means of a fork, might equally well watch her "shoo" the flies from the milk jug and cover the jug. And just as it watched its father stand erect and move off in the upright position, a movement it will shortly attempt to imitate, so it might well have watched him regularly place the lid upon the dust bin. But if it never sees these sanitary proceedings carried out, then it has no tendency to imitate them and so develope the sense which would finally act automatically, just as it will use its fork and walk automatically. A little later it begins to talk, the result of hearing and imitation, whilst it begins to interpret what it sees and hears and to put the result of observation into more or less intelligible language.

How his parents swell with pride when he first says "cat" or "pussy" as a result of having heard the appellation repeatedly applied to the animal which he has long observed as having four legs and

a tail and various other characteristics. A little later he will connect up certain words he has heard repeatedly and say "Give baby cake."

But does he ever say to his mother: "Cover baby's milk" and what would she say if he did? She would undoubtedly expect his brains to burst. And yet, why shouldn't he and why doesn't he? Simply because he has not had the example to follow. Simply because the expression has not been repeated often enough to become a part of his mental equipment and because the action of covering the milk has not been sufficiently often under his observation. It has not become a sense or subsense if you will, whilst the acquirement of cake has.

During this infant stage then it is obvious that unless his parents give him the lead, he has a poor chance of developing this health sense.

And now let me talk to those who prepare certain mental pabulum for him whilst he is in the fairy story and nursery rhyme stage. These people can do something for the sense of which I am speaking, even if the parent fail to do so, for herein lies a means of cultivation previously missed. The usual fairy story depicts a good boy or a bad boy who meets giants that do not and probably never did exist. Both the boy and the giant do wholly impossible or at least improbable things which altogether dislocate our developing child's ideas and mental vision.

Much of it, whilst serving no useful purpose, teaches nothing of value, but rather burdens the mind with impossibilities and improbabilities.

Now, why not invent stories with a definite value, stories that will, whilst being of a nature to hold the child's interest and remain in his memory, convey real facts and principles of value in later life. What an opportunity we are missing. Just think how tellingly one might describe the adventures of a ghoulish fly which laid its eggs in the manure heap of the palace stable. How out of these eggs came a legion of other ghoulish flies intent upon slaying the Princess's baby. How they fed upon filth which they carried to the golden cradle and with which they contaminated the baby's lips. The baby thereupon dies and the distracted Princess calls for a knight who will go forth and swat all flies. And think of the illustrations !

Then what of the nursery rhymes, what an opportunity to hash up our hygiene in never-to-be-forgotten form.

As they are, many of those we learnt in infancy and have never forgotten, contain no material of the slightest value, they encumber our brains without adding to our knowledge and yet how nourishing they might be to our health sense.

Why not—

Little Jack Horner
Sat in a corner,
  Tasting a tainted pie.
One sniff and he said
If I eat it, I'm dead,
  So he threw it away with a sigh.

How many cases of ptomaine poisoning might not this rhyme save in later life. The original rhyme adds nothing to our education, except that a mythical person—Jack Horner—had a good conceit of himself, "What a good boy am I," he says. I will go further and say that one at least of these rhymes may do actual harm and is certainly out-of-date.

Little Tommy Tupper
Sang for his supper.
What shall we give him?
White bread and butter.

Now this rhyme is likely to carry on the bad suggestion that white bread is the proper thing to give Tommy. Whereas we are now assured that he should have brown whole-meal bread.

Again, why suggest that Simon was simple and endeavoured to get away with a pie without paying for it? Why not make him clever and give him a sanitary sense, that he may be an example to all who read, thus:

Clever Simon
Saw a pieman
  Selling uncovered pies.
Said Clever Simon
To the pieman:
  "What about the flies?"

And so on.

Then we have "Old King Cole was a merry old soul" *et cetera*. Why not substitute a rhyme which will direct attention to what is practically the only present known means of reducing the cancer rate in the community—I mean the early removal of such things as moles, warts, local irritations *et cetera* which so often become malignant in later life.

Thus:

Old King Cole
Had a very large mole,
  A very large mole had he;
So he called for his purse,
And got him a nurse,
  Then he sent for his surgeons three.

Old King Cole
Lost that very large mole
  At the hands of his surgeons three;
Then he said to his nurse,
"Just hand me my purse,
  I'll pay, for I'm cancer free."

And so on. I only make the suggestion; others can improve upon my examples.

Now let us follow the child to school. Here from the beginning he is required to develope the sense of reading, writing and arithmetic. I call them senses because the execution of them becomes to some extent automatic or involuntary. They do not entirely require concentration and mental effort in later life.

How do we begin to learn these subjects? Undoubtedly by observation of eye assisted by constant repetition and practice.

"Twice one is two" *et cetera* day in, day out, for weeks and months we repeat it and finally the facts become second nature, so that without much trouble or conscious mental effort we know that twice one is two mechanically and automatically and put the fact into actual practice in our daily lives as it becomes necessary.

So C-A-T, cat becomes practically an automatic mental process, after we have repeated it sufficiently often. Again writing becomes an automatic process requiring no mental effort on account of repeated trial. The learning of these subjects commences early in our education and to the extent of the foundation principles becomes almost a sense. We may not understand why we do this or say that. We may not at first appreciate the significance of or properly interpret this or that, but as we grow older, an appreciation of their value and the application of the principle follows the development of our reasoning faculties. Now I am going to suggest that the laws of health and the principles of right living are not the side lines of education they have been made in the past, but are the most important subject in our education and, further, that the development of the sense governing them should be carried on side by side with the development of the sense of reading, writing and arithmetic and be given at least equal prominence from the commencement to the end of our education. And I am going to suggest further that we should learn and teach the laws of hygiene and sanitation by the same means, constant repetition from early life of those principles in a form which will in the same way develope a sense.

At first, as in the case of the three R's, we shall learn only to repeat certain facts without much heed to their interpretation and application, but the principles will become ingrained in early life and the practice and application follow with the years, because they will be foundation principles of right living, just as our early school methods of today found the principles of education and economic life.

What is it we ask the child to write in his writing-book and read in his reading-book? Is it something of value? Do we study economy in education? Does he learn to read and write and at the same time get some valuable information from what he reads and writes? Very often, I fear not. Then why not make it so? Why not prepare his exercises with this end in view? What he often gets now is something like this: "Tom had a rabbit. It got out. The dog bit it."

Why not substitute something like this? "The fly is not a nice insect. It carries filth to our food. We should kill it. We should not allow it to lay its eggs in the stable manure" and so on. Should we not thereby be taking advantage of his writing and reading exercises as a means to develope his health conscience without enlarging his curriculum? It would be economy in education. We should be killing two or even three birds with one stone and wasting no opportunity.

And when he begins to learn and recite poetry, why waste his time and our opportunity upon such poems as "Mary had a little lamb," at least until the time comes when he appreciates differences in poetical style and beauty of expression. That is surely a subject of its own.

If I may be permitted to parody an old classic with a view to illustrating my meaning, why not some real information as follows?

Mary had a little nit
Glued tightly to a hair,
No matter how she brushed and combed,
The nit was always there.

She took it to the school one day,
Which was against the rule;
It made the children shriek with rage
To see a nit at school.

"Go wash your head in kerosene,"
The angry teacher cried,
"And never come to school again
Until that nit has died."

Why not an ode to a rubbish bin?

Out in the yard and in the shade,
We keep a covered bin
Of iron, Daddy had it made
To put the refuse in.

And all around the top, the lid
Sits close and fits it tight,
So all the smelly scraps are hid
Well out of scent and sight.

And not a fly can get inside
To lay its eggs and breed;
And all in vain the rats have tried
To climb within and feed.

The cover keeps the garbage dry,
Which, if it's warm and wet,
Is very apt to putrefy
And nasty smells beget.

And we are told that liquids must
Be poured off down the drain,
Not put into the bin, to rust
It through and through again.

'Tis thus that we ourselves protect
In sanitary way,
From insect pests that may affect
Our health, from day to day.

For flies, as you already know,
Distribute dire disease;
Whilst rats may prove a fearsome foe,
By reason of their fleas.

Here we have the memory-aiding jingle presenting valuable facts in hygiene and at the same time teaching the elements of rhyme and metre. Throughout the whole of our education then let what I have called the most important thing in life, health, be pushed before the individual unobtrusively but persistently wherever possible and it will come to be regarded as the basis or groundwork of all his educational impressions.

Constant repetition, frequent observation and the intimate association of the principles of hygiene with his other educational activities will, I think, create or go far towards assisting to create what all those engaged in health propaganda work are striving for, namely the public health conscience or what I have called the public health sense.

And what will be the result?

The budding man will have recognized a new responsibility for individual and communal health side by side with his other responsibilities. He will perhaps recognize the need for constant supervision of his own physical condition and his actions as they affect himself and the community as a whole.

There will develope as in his other activities a spirit of emulation between himself and his fellows which may lead to regular medical examination after the school period is over and especially when he is about to enter matrimony or embark upon active industrial or professional life. Whilst in regard to the former—matrimony—I venture to say, that without divorcing sentiment from love and marriage the mere fact of his having developed a health sense will lead him to look for fitness in his mate and love where this exists.

The budding woman, about to enter upon marital life, will recognize her responsibility to her children and will the more willingly fit herself to serve them. Both will more readily recognize their duty in the development of a health conscience in their offspring.

THE STUDY OF THE REFLEX.

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ONE of the most obvious manifestations of life, so striking indeed that Herbert Spencer used a description of it as a proximate definition, is response to change in the environment. A child, desirous of ascertaining whether an object is alive, will poke it with a stick and wait for the response that the living creature generally displays. The higher in evolution an animal is, the wider is the range of environmental change to which it is sensitive. The same is true of man in different degrees of civilization. A sudden fall in the meniscus of a mercury barometer, even if observed by a quick-eyed savage would not affect his conduct, but seen by the master of a sailing ship will lead to a big outburst of activity. Some of these responses to environmental change require the consciousness and volition of the animal and are subject to variation; others whose nature is predestined in the structure of the lower levels of the nervous system and which act independently of volition are reflexes. From the physiological point of view true reflexes shade off into instincts and these into habits, but we will first of all confine ourselves to those responses which are truly reflex and which can be studied as automatic and predictable activities coordinated by the lower levels of the central nervous system and consequent upon the reception of messages through afferent nerve channels. All the entering stimuli that set the central nervous system in action, are not necessarily produced by external events; changes in the body itself arouse what Sherrington has termed proprioceptive impulses and these are of great importance especially in a directive sense. Further it is necessary to limit ourselves to those responses in which nerve mechanisms are operative, for it is possible to have body changes due to chemical messengers or hormones. The blister that arises after friction, may not require any participation of nerve action.

The Components of a Reflex.

From the morphological standpoint the simplest reflex would be that in which the impulse ran from the point of reception or the receptor to the responding organ or effector without interruption, that is the whole reflex arc would be confined within the limits of a single neurone. It is possible that this may be an important method in the lower invertebrates, but in the higher animals it is too crude. The only example I can think of in the human body is the local dilatation of blood vessels on the application of warmth; in this very simple response the central nervous system is not concerned and the term reflex is applied only by courtesy. Possibly also in the wall of the intestine there is a primitive nerve network in which direct conduction from receptor to effector takes place without intervention of synapses. But in true reflexes the path is profoundly complex. In the older textbooks one frequently saw a diagram in which an afferent neurone was pictured making contact with a motor neurone. That soon gave place to the diagram in which the two were separated by a neurone within the central nervous system. This in its turn we have found far too simple to explain even the most rapid and restricted of reflexes. We must now assume in our picture that the receptor impulses are polyneuronic, effector impulses are polyneuronic and that between the two there lies a most complicated nerve mechanism. Let us look at these components in succession.

The Receptors.

The receptors are mechanisms specially attuned to some form of impinging energy so that they start nerve impulses. Some are surface receptors and give us cognizance of events in the outside world; if the alimentary canal be regarded as a surface and food as external matter, these interoceptors may be here included. Of the exteroceptors some respond to energy arriving from some distance and are hence termed distance receptors. Then within the body we have special receptors which are activated by the body's movement or position in space. Some of these proprioceptors are found in muscle and tendon and are set in action by tension, some in the lung respond to inflation and some in joints are excited by pressure. In the head we have the labyrinth, the main proprioceptive organ. They are of service in acting as guides in the regulation of degree of movement and do not all enter consciousness. In every reflex we must of necessity start with the receptors concerned, yet physiology has spent much effort in endeavouring to elicit reflexes by stimulating afferent nerves. Success in this has been very restricted. We can be sure of eliciting response to stimulation of nerves that in the conscious animal produce sensations of pain. According to Sherrington no special receptor for pain is necessary, all that is required being a naked nerve ending and the histology of the cornea bears this out. We can also get reflex dilatation of the arteries in the rabbit by stimulating the depressor nerve and in most animals certain inhibitions such as stoppage of respiration on stimulating the glosso-pharyngeal

or abolition of "tone" in a muscle by stimulating certain muscle afferents; but the great bulk of reflexes we cannot evoke from any stimulus other than the natural and adequate stimulus applied to the receptors. Why can we not do so? Simply because we cannot in a nerve trunk single out the individual nerve fibres and even if we could, we should have to learn the precise pattern of the excited receptors. A receptive field is a mosaic of receptors and in each of our sensations the pattern synchronously excited bestows the special quality which the brain interprets. Even in the Helmholtz hypothesis of hearing it is not assumed, as is often done in error, that a single tone sets a single fibre of the basilar membrane in resonance vibration and that therefore impulses are confined to a solitary nerve fibre, but that sensation depends on the varying amplitudes of movement of the components of a group. In the Waller-Ewald suggestion it is interesting to note the pattern idea carried further. In what Head has termed "epicritic" sensation the pattern determines discriminative power. Head as a result of his observations declared that when a nerve trunk had been cut and allowed to regenerate, restoration of epicritic sense took years to accomplish, whereas if the nerve trunk had been crushed only, epicritic and protopathic regenerated at the same time. Now Kilvington and I found by experiment that when a nerve trunk is crushed the regenerating fibres pass down their old paths and the pattern is retained; on the other hand in a cut with subsequent union grave "distortion of the pattern" takes place.(1) We attribute the late return of epicritic sensation not to delayed regeneration but to the reeducation of the brain in its interpretation of the distorted pattern. Our views have been supported by Langley and others, but apparently Head prefers his original idea.

A further complication exists in the changing character of the impulses in time. The simplest of such changes is the rhythm of muscle afferents which increases with increasing load, but diminishes with duration of tension. Recent evidence has made it likely that a receptor responding to stimulus produces periodic discharges of impulses which vary in frequency with the strength of the stimulus. This view clears up certain anomalies inherent in the "all or nothing" hypothesis of nerve action. It is possible that in a mosaic of receptors varying fatiguability will alter the relations of the impulses and also the pattern, whilst in the tickling that evokes the scratch reflex, it is the succession of patterns that constitutes the adequate stimulus. It would be just as hopeless to expect production of the scratch reflex by direct stimulation of nerves as it would be to give a recognizable visual picture by exciting fibres in the optic nerve.

The Effectors.

We turn now to the effector side of the reflex. In many cases we find a delicate grading of response. Thus in the eye insufficient secretion of tears would produce dryness and eventual ulceration of the cornea, whilst overproduction would cause blurred vision and possibly excoriation of the skin of the lower lid.

We find the contractile tissues participating in reflexes of great complexity. Take for example deglutition and the transport of food through the œsophagus. In the scratch reflex described so fully by Sherrington we find that an isolated portion of spinal cord is capable of carrying out this reciprocal movement and with a certain approximation of the foot to the point stimulated. But even in the simplest contraction of skeletal muscle there are indications that the stimuli arriving at the effector contractile fibres are adjusted with precision. For one thing a skeletal muscle is innervated from more than one spinal segment; of late there has been an attempt to show that each fibre is plurisegmentally excited; the mere picking out of the separate ventral horn cells is in itself a delicate adjustment. Again stimuli arrive rhythmically as shown by galvanometric records, part of this rhythm being due to a periodicity inherent in each nerve cell, but part being also attributable to the sequence of fibres passing into action and then becoming quiescent. We have recently learned that the postganglionic neurones not only help in distributing impulses but impose a new rhythm.

The Central Nervous System.

We were once content with a scheme of reflex phenomena resembling an electric current being offered a plurality of routes and distributing itself over these inversely as the resistance. A centre in such a scheme is merely the region of greatest convergence of synergic arcs. But we cannot be content any longer with such a presentation. We have seen that on the receptor side a reflex resembles an automatic telephone in that a certain combination or pattern is necessary to get the exchange going. But here the simile ends, for a reflex on the effector side may bear no resemblance to the messages on the entrant side. Further a reflex can persist after the cessation of receptor activity. It is true that there will be no effector activity, if there be no entrant impulses, but that does not indicate that there is a mechanical switching of the receptor impulses along certain effector routes. Even volitional movement of a limb is stopped if it is deafferented, just as a general would cease to give orders if all information from his fighting front were cut off. We are safer in assuming that a certain pattern of afferents acts like the penny in a machine where music is played or a doll dances; the starting agent must be a penny and not another coin and the mechanism is already there and wound up ready for action.

If our physiological unit in the nervous system is a reflex arc, we must be prepared to admit that an isolated reflex exists only in a portion of the nervous system separated off by trauma or disease or surgical interference. There are not only the arcs, but what I should like to call epiarcs were a hybrid permissible—arcs above arcs until the cortical level is reached. Then, too, as I shall endeavour to show in a later section of my address, the setting in action

of a reflex may agitate neighbouring nerve matter and start activities of no functional value. It would seem that the whole central nervous system reverberates with each action of its parts. Tracings of bladder pressure show that this organ responds sympathetically to activities in the cord quite unconnected with micturition and even at some distance from its own spinal connexions.

The Overflow Reflex.

The physiologist and thinking physician cannot help being puzzled by the existence of reflexes to which no function can be assigned; they are from the telelogical standpoint purposeless. My attention was first directed to this by a patient with considerable cardiac irregularity which a consultant regarded as more serious than vagal arrhythmia; yet the heart abnormality cleared up absolutely on removal of some gall stones. Every surgeon knows that manipulations about the duodenal region are liable to produce syncope. I have tried in vain in the anæsthetized dog to produce cardiac irregularity by inflation of stomach, duodenum, gall bladder, common duct and pancreatic duct. What was probably missing in my experiments was a region of inflammation and, further, distension alone seems to be a weak stimulus without strong muscular action of the distended viscus.

The idea of overflow when afferent impulses are pouring into any level of the nervous system, is not new, for it has done good service in the explanation of referred pain. A viscus is inflamed, nociceptive impulses stream into the central nervous system and overflow into the paths of some contiguous skin afferents. No one can contend that this referred pain has functional value; it directs attention to the site of the projected pain which may be remote from the real trouble, as for instance sensation in the right shoulder when there is liver trouble. But invariably there is segmental propinquity in the central reception of the afferents from viscus and from the skin area concerned. What I venture to put forward is that there may be overflow into the effector paths and that this explains a large number of reflexes which must be designated purposeless. I confess I have read the writings of the late Sir James Mackenzie on the subject of disturbed reflexes with much disappointment. It seems to me that he did not deal quite fairly with physiological research and exposition, for there are ideas enunciated as new which are old established doctrine in physiology. Nor did I gain any light on the problem I am now treating. Briefly, then, I would group together a number of purposeless reflexes which find their explanation in afferent overflow into motor paths in the same segment or adjacent segment. Let me mention a few of these.

(i.) Irritation in the region of the duodenum and gall bladder will often cause irregular heart action through vagal stimulation. Here the afferents course upwards in the vagus and when they reach the medulla overflow into the cardioinhibitory centre which has the vagus again as its effector nerve. No one could, I imagine, suggest a functional purpose for this reflex.

(ii.) Stimulation of the nipple often gives dilatation of the pupil quite unconnected with erogenous feelings; the pupillo-dilator centre, it may be remarked, is to be found in the spinal cord at the level of the second thoracic nerve.

(iii.) It is a common experience with dentists, I am told, that when they are irritating the tooth pulp they observe fibrillar twitching of the facial muscles.

(iv.) A growing nail displacing one that has been injured will often give reflex twitching of a few muscle fibres in the finger concerned.

(v.) Strain of eye muscles, as in strong deviation of the eyes, can bring about spasm of the *tensor tympani;* it is possible that the sixth cranial is specially involved.

(vi.) Bronchiolar spasm can occur apart from protein hypersensitiveness or anaphylactic reaction as a nerve reflex and the exciting afferents will be found in the receptive fields of the fifth cranial nerve.

(vii.) Certain types of vomiting can be explained as overflow reflexes, though it must be remembered that the vomiting centre is extraordinarily sensitive, responding not only to a large number of afferents, but directly to rise of intracranial pressure and a variety of drugs.

(viii.) Trismus of the jaw arising from tooth afferents can hardly be regarded as a protective reflex.

(ix.) Retraction of the testis in renal colic.

(x.) Hiccough can, I think, be regarded in this category.

(xi.) Blinking of the eyes when a loud sound is heard may, perhaps, be thought by some to be protective, but such purpose is not obvious and further the reflex is less noticeable in adult life.

The importance of the spatial element in the central nervous system has been noted by many, particularly by Sherrington[2] who in 1897 gave certain general statements concerning short spinal reflexes, the first of which was that "the degree of reflex spinal intimacy between afferent and efferent spinal roots varies directly as their segmental proximity." In other words the closer the segmental association between receptor and effector, the more likely are these to be employed in the same reflex.

Expression of the Emotions.

I now come to a reflex activity which involves the highest levels of the central nervous system and that is the physical expression of the emotions. In Darwin's famous work on this subject there are three principles enunciated.

The first is the principle of serviceable associated habits. "When any sensation, desire, dislike *et cetera* has led during a series of generations to some voluntary movement then a tendency to the performance of a similar movement will almost certainly be excited, whenever the same or any analogous or associated sensation *et cetera,* although very weak, is experienced." Herbert Spencer whom Darwin quotes, had already dealt with this explanation of physical signs of emotions. Thus in anger the nostrils are dilated, because in fight the mouth

was once busy biting or buried in the adversary's hair. In this principle Darwin accepts the doctrine of the transmission of acquired characters much more explicitly than in "The Origin of Species." In the light of modern biology we cannot accept this explanation. A further error lies in the fact that "serviceable associated acts" may involve organs not under the control of the will. Thus circulatory excitement when danger is recognized is to be taken as preparatory for violent muscular activity in fight or running away. We can retain this principle all the same without bringing in transmission of acquired characters or the voluntary origin of the associated movements; through natural selection they have arisen as adjustments for possible actions to which the emotions may give rise.

The second principle is that of antithesis. Certain states of mind lead to certain actions as above; when an opposite state of mind is induced, movements of an opposite nature will appear. A dog in a hostile frame of mind holds his tail erect and rigid, the hairs bristle, the ears are directed forward, the head is held up and the eyes have a fixed stare. But when the dog meets his master the body sinks or crouches, the tail is lowered, the ears are depressed and so forth. It is now generally admitted that in this principle Darwin was not so happy in his generalizations as usual; indeed some of his illustrations have more than a suspicion of the far-fetched.

The third principle may be called that of overflow nerve energy and was first propounded by Herbert Spencer. The brain is in a highly excited state and nerve impulses pour into channels that bring about purposeless results. Laughter, smiling, blushing are typical illustrations. Darwin strongly emphasizes the purposeless character of the actions under his second and third principles; viewed teleologically they are meaningless.

I do not wish to deny the possibility of overflow, indeed I think it the correct explanation of certain visceral changes accompanying emotion such as those that involve the pupil and the intestine, but I desire to put forward a new hypothesis which I venture to believe explains the majority of those physical expressions under Darwin's third category and possibly all under his second.

Emotional Expression as a Social Signal.

A large number of body changes which are purposeless if we regard man as a single individual, become charged with meaning if we accept man as a unit of society. Man is not only human, he is co-human. A large number of emotional expressions I take to be signals or automatic indications to his fellows of his state of feeling. We find the same in those lower animals where the herd or pack instinct is strong. The wag of the dog's tail has been explained as a signal to the rest of the pack and followers of hounds have assured me that this is the case. Darwin in his book is obviously puzzled by blushing being confined to the exposed parts of the body. Had he thought of these as the visible portions, he would have arrived at the conclusion I am putting before you, I feel certain. This very visibility is surely a striking feature of the great number of emotional expressions. What the origin of any particular reflex may have been I cannot presume to tell; it may once have been purposeful; at any rate we must bring under consideration the fact that it is immediately interpretable by others. I cannot accept Dumas's idea that it was once voluntary and possibly conventional, as that could not explain the reactions occurring in organs not under volitional control nor the universality of recognition of the emotion expressed. Human beings, remote in race and knowing nothing of each other's language, can yet recognize mental states by the physical associated changes in the body. Anger, good fellowship, irritation, suspicion, shyness, subservience, admiration, fear, affection can all be interpreted by facial expression reinforced by gesture. Darwin though unable to explain why blushing occurs only on exposed parts, why in races who go naked it extends over a larger surface and why it is absent in certain dark skinned people, came curiously near to the truth. He states:

> It is not the simple act of reflecting on our appearance, but the thinking of what others think of us, which excites a blush. In absolute solitude the most sensitive person would be quite indifferent about his appearance.

He might have added that in solitude blushing never occurs, except perhaps in those who have a vivid imagination and who suddenly recollect a grievous *faux pas,* and even here it is the idea of others that is the determining factor. So strongly is the necessity of communal life implanted in the human brain that solitary confinement is the most dreaded of punishments or accidents and will if protracted lead in the majority of cases to insanity. I have little belief that a cave-man period existed in which a hairy man lived alone with his hairy mate. Human beings have lived in caves, but the highly organized cliff dwellings of Arizona and New Mexico show that society was complex. In Darwin's and Spencer's overflow theory and in the former's antithesis theory no cognizance was taken of the fact that the external manifestations are not concealed, but exceedingly prominent and perceptible. Smiling or blushing might just as likely affect muscles or arteries well concealed by the clothes, but they do not. In laughter we announce our detection of a particular type of incongruity; why it should be serviceable to announce such is not part of this inquiry. And so for the wide range of emotions we have physically associated changes which give our fellow men cognizance of what we are feeling. The purpose of this is to be found, I think, in the importance or shall I say the necessity of cooperation where knowledge of and sympathy with emotional conditions is so valuable. If this hypothesis is correct, it indicates for what a very long period man has lived in societies. Communal life has stamped itself upon his automatic reflex acts. I do not pretend to have covered the wide range of modern psychology, but the only reference I have found to the importance of emotional expression from the standpoint of human intercourse, is in George Dumas's article *"L'Expression des Émotions"* in the *"Traité de Psychologie"*

under the same author's editing. This, however, is vitiated by an hypothesis of the origin of such reactions founded on voluntary acts that few psychologists, I imagine, and certainly no physiologists could accept.

Conclusion.

With much established doctrine on reflexes my address has dealt little. I feel too deep a reverence for the work of Sherrington to make a poor *précis* of it for general consumption. I would prefer that my hearers, if they have not done so already, should drink at the source and not be refreshed by the bottled products of a middle man. If I have done nothing else than make some of my hearers commence the study of the integrative action of the nervous system I have not spoken in vain.

References.

(1) W. A. Osborne: "Epicritic Regeneration," *Intercolonial Medical Journal of Australasia*, February 20, 1909.
(2) C. S. Sherrington: "Phil. Transactions," 1897.
(3) George Dumas: "*L'Expression des Émotions*," "*Traité de Psychologie*," 1923.

VITAL STATISTICS IN THE LIGHT OF POST MORTEM FINDINGS.

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OFFICIAL statistical tables giving the causes of death of the population are based upon the diagnoses entered on the death certificates. These same tables are made use of for actuarial purposes, supplemented by the clinical findings of the medical officers to insurance companies and others. It is important to know the relative accuracy of the data on which these tables are based.

Hippocrates, the Father of Medicine, has wisely said *à propos* of medical practice that: "Art is long, life is short, experience is fallacious and judgement difficult." These words are as applicable today as in the times of Hippocrates. We have, however, much more experience to guide us, even though we may be sometimes led astray and we have many more mechanical aids to enable us to ascertain the condition of those parts of the body hidden away from actual sight and touch. Considering the difficulties that have to be surmounted, one is continually surprised in the *post mortem* room by the accuracy of diagnoses made during life. On the other hand diseases which from the *post mortem* findings one might have expected to have been correctly diagnosed during the life of the patient, have sometimes been missed in spite of the great skill of those concerned in the diagnosis.

In the Adelaide Hospital usually in about half or a little less than half of the patients who die, is a *post mortem* examination carried out on the body. In private practice *post mortem* examinations are hardly ever attempted. When an autopsy has been carried out, especially if supplemented by microscopical examinations when necessary, an accurate statement of the condition or conditions leading up to death is nearly always obtainable. How far do the diagnoses made by medical practitioners as to the cause of death conform with the *post mortem* findings in these cases? By comparing the antenecropsy diagnosis with the results of the *post mortem* examination it should be possible to ascertain in a general way the approximate percentage of cases in which the death certificates are correct, the percentage in which they are partly so, important features being omitted, and the percentage where they are entirely wrong. If it is found that there is a very considerable percentage of error in the death certificates, then it is necessary to receive with a good deal of caution, the statistics dealing with the causes of death. This comparison between antenecropsy diagnoses and those made after the *post mortem* examination may show us in which diseases the deaths have been underestimated and in which they have probably been overestimated.

For some years it has been the custom at the Adelaide Hospital for the pathologist to be informed when a *post mortem* examination is required by means of a card on which are placed amongst other particulars a short summary of the clinical condition and the diagnosis which would appear on the death certificate if no *post mortem* examination was carried out. After the *post mortem* examination has been made, the final diagnosis is added and it is seen whether it tallies more or less completely or not with the antenecropsy diagnosis. An analysis has now been made of the cases (two hundred and thirty in number), in which this procedure has been followed during the years 1924 and 1925.

In spite of the care exercised in well-conducted hospitals in the diagnosis of patients it is realized that quite a considerable error must exist. In a recent review appearing in THE MEDICAL JOURNAL OF AUSTRALIA, the statement occurs that: "One of the best conducted hospitals in the United States admits that 60% of the conditions seen at autopsy are wrongly or incompletely diagnosed." If this is the case with hospital patients, one cannot expect that the diagnoses in private practice are any more accurate. It would, therefore, seem that the information published by statisticians based on the diagnoses given in death certificates must be liable to very grave errors, in spite of the fact that mistakes made in one direction may be compensated to some extent by reverse mistakes (for example conditions wrongly diagnosed as tuberculous may be compensated by the number of tuberculous lesions which were not recognized as such).

The summary given below shows as far as the Adelaide Hospital is concerned that out of 230 cases in 1924 and 1925 the diagnosis was essentially quite correct in 123 (53·5%); it was partly right, though important lesions were overlooked or misinterpreted, in 68 or about 29·5%; it was more or less completely wrong in 30 or 13%; in addition have to be considered a certain number of cases

(seven) in which the patient was under observation only for a very short period of time, so that no proper diagnosis could be made, bringing the percentage to 16.

Further, I have grouped together malignant cases, tuberculous cases and cases of cerebral hæmorrhage, uræmia and cerebral tumours, so as to see to what extent these various conditions were correctly diagnosed, when they were diagnosed as present and this diagnosis was incorrect and when they were present but had not been diagnosed. It will be seen from the small figures available that ten out of twenty-nine malignant growths were not diagnosed and that in two cases a malignant growth was diagnosed but was not found. Tuberculous lesions of importance were not diagnosed as present in eight patients out of twenty-two suffering from tuberculosis, not necessarily pulmonary tuberculosis though some cases were such. On the other hand, tuberculosis was diagnosed but not found present in three cases.

Cerebral hæmorrhage was met with eleven times and diagnosed ten times, but in seven other instances it was thought to be probably present, but did not occur. Five cases were accurately diagnosed as uræmic, but in another six cases the lesions found *post mortem* were probably insufficient to give rise to uræmia and the diagnosis was disallowed. Cerebral tumours were diagnosed twice correctly and were present once but not diagnosed.

If any conclusion is to be based on the small amount of data here submitted, it is that malignant growths and tuberculosis are commoner causes of death than the statistics obtained from death certificates show; also that the number of deaths from cerebral hæmorrhage is probably overestimated, as is the case also with uræmia. Probably in more than 16% of death certificates the stated cause of death is quite wrong and in many other certificates the data appended and made use of by registrars and statisticians are deficient or defective in an important degree. It seems worth inquiring to what extent our statistics of disease are vitiated by this degree of error.

Summary of Results.

Total number of deaths, 230.	
Cases diagnosed correctly	123 = 53·5%
Cases in which the diagnosis was partly right	68 = 29·5%
Cases in which the diagnosis was wrong	30 = 13 %
Cases in which no diagnosis was made	7 = 3 %
Cause of death obscure, even after *post mortem* examination	2 = ·87%

Thus in thirty-seven cases or 16% or in one case out of every six or seven the cause of death given in the death certificate is likely to be quite erroneous.

Conditions diagnosed correctly, 123.	
Cerebral hæmorrhage	9
Uræmia	4
Cerebral tumours	2
Tuberculosis in its various forms	11
Malignant growths	13
Other conditions	84
Conditions of which the diagnosis was wrong, 30.	

The diagnoses (suspected or definitely stated) which were wrong included:

Uræmia	4
Cerebral hæmorrhage	3
Miliary tuberculosis	3
Indefinite	1

The lesions found *post mortem* and not diagnosed or suspected included:

Pulmonary tuberculosis	4
Tuberculosis elsewhere	2
Carcinoma (in one œsophageal stricture diagnosed)	3
Conditions of which the diagnosis was partly right, 68. These include:	
Carcinoma correctly diagnosed or suspected, though the site of origin was not always right	6
Carcinoma found present but not suspected	6
Carcinoma suspected but not found	2
Cerebral hæmorrhage suspected and present	1
Cerebral hæmorrhage suspected and softening found	1
Cerebral hæmorrhage suspected but not found	2
Cerebral hæmorrhage present, diagnosis encephalitis or tumour	1
Tuberculosis diagnosed or suspected present	3
Tuberculosis present but not suspected	1
Uræmia suspected and present	1
Uræmia suspected but not found	3
Cases in which no diagnosis was made, 7.	
Cerebral tumour found in	1
Cases in which the diagnosis was obscure even after autopsy, 2.	

Summing up the various lesions listed under the different categories, we find the following:

Malignant growths diagnosed correctly	19
Malignant growths present but not diagnosed	10
Malignant growths diagnosed but not present	2
Tuberculosis diagnosed and present	14
Tuberculosis present but not diagnosed	8
Tuberculosis diagnosed but not present	3
Cerebral hæmorrhage diagnosed and present	10
Cerebral hæmorrhage present but not diagnosed	1
Uræmia diagnosed and present	5
Uræmia diagnosed but not present	6
Cerebral tumours diagnosed and present	2
Cerebral tumours present but not diagnosed	1

Instances in Which the Diagnosis was Wrong.

1.—180, 1924, male, *ætatis* eighty, under observation for four days. The diagnosis was œsophageal diverticulum or (?) stricture. Death was attributed to cardiac failure or inanition. Autopsy revealed a squamous epithelioma of the œsophagus opposite the bifurcation of the trachea and gangrene of the lung.

2.—60, 1924, male, *ætatis* forty-nine, under observation for three days, in a drowsy state with no history obtainable and of a yellow, earthy colour and very emaciated. The blood film suggested pernicious anæmia or a severe secondary anæmia. Carcinoma of the stomach was present.

3.—87, 1924, male, *ætatis* seventy, under observation for six days with difficulty in breathing and feeling very weak. The pulse was fibrillating. The diagnosis was emphysema and cardiac failure. Autopsy revealed extensive pulmonary tuberculosis and an inspissated empyema.

4.—107, 1925, female, *ætatis* sixty-one, under observation for six days, had had shortness of breath and had been unable to work for some time; she had definite Cheyne-Stokes's respiration. Death was attributed to sudden heart failure. Pulmonary tuberculosis was found to be the cause of her condition.

5.—198, 1925, male, *ætatis* sixty,under observation for three days. A diagnosis was made of bronchitis followed by broncho-pneumonia and heart failure. The autopsy revealed pulmonary tuberculosis with miliary spread.

6.—186. 1925, male, *ætatis* fifty-four, under observation for three weeks. He had been admitted with weakness and pyrexia of two months' duration and indefinite pains in the joints and abdomen, but no other complaint. He had

a swinging temperature, pyorrhœa, pus in the urine, but no signs in the lungs. No reaction was obtained to the Widal and Weil-Felix tests. No malarial parasites were detected. The leucocyte count was 6,000. He became gradually weaker and died, the cause of death being "indefinite." The autopsy revealed the presence of pulmonary tuberculosis with a cavity, of tuberculous ulcers in the intestine and tuberculosis of the epididymis and prostate.

7.—33, 1925, male, *ætatis* seventy-eight, under observation for three days, the illness having begun four days before admission with pains in the stomach. The patient was very weak and complained of general abdominal tenderness. There was no rigidity. He gradually became weaker. The diagnosis was pancreatitis, cholecystitis or malignant disease. The autopsy revealed tuberculous involvement of the left kidney and suprarenal gland and tuberculous peritonitis.

8.—230, 1925, male, *ætatis* seventy-six, under observation for seven weeks, with bronchitis and hypostatic pneumonia. The autopsy revealed tuberculous peritonitis, tuberculosis round the *vesiculæ seminales*, groups of miliary tubercles in the lung, 0·8 litre of fluid in the left pleural cavity and enlargement of the mesenteric and mediastinal glands; this enlargement on microscopic examination was found to be due to lymphatic leuchæmia.

9.—219, 1925, male, *ætatis* thirty-three, under observation for seven days with a history of old syphilis, of hemiparesis nine days previously and monoplegia of the arm followed by four fits and death. A diagnosis was made of cerebral syphilis. The autopsy revealed thrombosis of the cerebral sinuses and cerebellar hæmorrhage.

10.—197, 1924, male, *ætatis* sixty-six, under observation for seven days with double hemiplegia. The diagnosis was cerebral hæmorrhage. Hypostatic pneumonia was found with moderate interstitial nephritis and some hypertrophy of the left ventricle. No cerebral hæmorrhage was present, but there was atheroma of the circle of Willis and some indefinite softened areas in one occipital lobe.

11.—92, 1924, female, *ætatis* eighty, under observation for eight days, with symptoms suggestive of a cerebral abscess or more probably uræmia, was found to have acute necrotic pancreatitis with fat necrosis and lobar pneumonia.

12.—95, 1924, male, *ætatis* seventy-six, under observation for eighteen days with a diagnosis of chronic uræmia and hypostatic pneumonia. There was a large vesical calculus with hypertrophy of the bladder, double hydronephrosis and a hypertrophied heart.

13.—111, 1924, female, *ætatis* thirty-three, under observation for eight days, with a diagnosis of miliary tuberculosis. There was an ulcer of the stomach which had become malignant. The lungs were extensively infiltrated with secondary growth and there was a malignant growth in the right ovary.

14.—163, 1924, male, *ætatis* fifty, under observation for seven days, with an illness which had started with diarrhœa and vomiting; the patient was very ill at the time of admission with herpes on the lips and signs at the base of both lungs. The urea nitrogen content of the blood was fifty-five milligrammes per hundred cubic centimetres. The diagnosis made was miliary tuberculosis or uræmia. The autopsy revealed acute colitis and congestion and œdema of the lungs with hypostatic pneumonia.

15.—187, 1924, male, *ætatis* fifty-three, under observation for two days, had had tuberculosis for nine years and had had occasional attacks of weakness. He was admitted in a state in which he could not be understood and soon became comatose. He had signs of bronchitis, hæmaturia and a squint of the right eye. Lumbar puncture yielded normal fluid. A diagnosis of uræmia or miliary tuberculosis was made. The autopsy revealed an adherent pericardium, slight broncho-pneumonia and only some slight interstitial change in the kidneys, death being attributed to toxæmia and heart failure. There was no macroscopic or microscopic evidence of pulmonary tuberculosis, but a small patch of interstitial pneumonia.

16.—178, 1924, male, *ætatis* thirty-six, under observation for three days, had had a pyrexia for ten days before admission. The temperature varied from 35·5° to 39·4° C.. There was profound prostration and *subsultus tendinum;* no reaction was obtained to the Widal test. A diagnosis of enteric fever (doubtful) was made. The autopsy revealed an acute streptococcal fibrinous pericarditis.

17.—164, 1924, male, *ætatis* seventy-eight, under observation for two days with pains in the stomach following a dinner of stale stewed peas and corned beef. There had been severe colic and vomiting. Death was attributed to ptomaine poisoning (?) and heart failure. Autopsy revealed organization in the lungs with tuberculosis and a primary carcinoma developing in the lung tissue, as well as an inspissated calcified empyema. The lung condition had apparently given rise to heart failure and the ptomaine poisoning was probably an epiphenomenon.

18.—23, 1924, female, *ætatis* fifty-two, under observation for seven days, had had a succession of fits, Jacksonian in type, commencing on the right side. Albumin was present in one specimen of urine. The diagnosis made was uræmia and hypostatic pneumonia. The autopsy revealed no interstitial nephritis, but atheromatous vessels at the base of the brain and a small area of cerebral softening.

19.—63, 1924, male, *ætatis* seventy-eight, under observation for five days; the condition was diagnosed as auricular fibrillation and acute heart failure. The autopsy revealed double pleural effusion, atheroma of the coronary vessels, infarcts in the lung and slight interstitial nephritis.

20.—28, 1924, male, *ætatis* seventy-one, under observation for twenty-six days, was convalescing from Brill's disease and was sitting out of bed when he collapsed and died within six minutes. Death was attributed to cerebral or pulmonary embolism, but proved to be due to coronary disease.

21.—23, 1925, male, *ætatis* seventy, under observation for one week with diarrhœa and vomiting, a swinging, high temperature, peculiar pulmonary signs and neck rigidity. The diagnosis made was septicæmia and respiratory failure. The autopsy revealed typhoid ulcers of the intestine, a septic infarct in the lung and hypostatic pneumonia.

22.—173, 1925, male, *ætatis* sixty, under observation for seven days, had had cough and hæmoptysis for a month. There were signs of consolidation at the apex and base of the right lung. The heart sounds could hardly be heard. There were repeated rigors while he was in hospital. The diagnosis made was gangrene of the lung or septicæmia. Malignant endocarditis was found at autopsy with an empyema and slight pneumonic consolidation.

23.—233, 1925, male, *ætatis* thirty-three, under observation for fourteen days suffering from weakness and shortness of breath. He had had a swollen leg and was very anæmic; the liver was enlarged and there was free fluid in the abdomen. The autopsy revealed malignant disease affecting the liver with cancerous glands in the mediastinum and along the aorta.

24.—245, 1925, male, *ætatis* thirty-two, under observation for twelve days with abdominal pain, headache and fever; a Widal reaction was obtained and there were signs of consolidation in the lungs. Jaundice developed and peritonitis was suspected. A diagnosis of typhoid fever was made. The autopsy revealed a degenerated infected hydatid cyst of the liver with cholangitis.

The following five cases were under observation in hospital for only one day and so little opportunity was given for thorough investigation.

25.—16, 1924, male, elderly, admitted in a moribund condition with a history of sudden collapse. Cerebral hæmorrhage was suspected. The autopsy revealed tuberculosis of the middle lobe of the right lung and of the mediastinal and hilar glands and pleura and early tuberculous peritonitis.

26.—56, 1924, male, *ætatis* eighty-seven, was admitted struggling and groaning, with crepitations all over the right lung. No urine could be obtained. He died after a fit and a provisional diagnosis of uræmia was made. The autopsy revealed infarction and rupture of the heart and coronary disease.

27.—13, 1925, male, *ætatis* sixty-six, was admitted in a comatose condition with a history of hæmatemesis. He appeared to recover slightly, but died suddenly. The hæmatemesis was thought to be due probably to a cirrhotic liver, but was found to come from a carcinoma of the stomach.

28.—186, 1924, male, *ætatis* fifty-three, under observation for one day, was admitted in an unconscious state, having had severe epistaxis one week before. He had been ill for four days previously with severe diarrhœa and vomiting. The cerebro-spinal fluid was under increased pressure. The systolic blood pressure was 130 millimetres of mercury and the diastolic 80 millimetres. There was no albumin in the urine. The diagnosis made was that of uræmia with cerebral hæmorrhage, but the autopsy revealed malignant endocarditis, and old aortic stenosis with calcification and infarcts.

29.—159, 1925, female, *ætatis* fifty-two, under observation for one day, was sent into hospital on account of suspected diabetes with acidosis. On admission no sugar or acetone was found, though there was much diacetic acid present. There was an alcoholic history. The illness had begun suddenly with acute abdominal pain and vomiting. Mental impairment had been noticed the day before admission. A doubtful diagnosis of diabetes with acidosis was made. The autopsy revealed pyelonephritis with some cirrhosis of the liver.

30.—237, 1925, female, *ætatis* forty-one, under observation for one day, but she had had acute abdominal pain, vomiting and diarrhœa for thirteen days. The diagnosis of acute entero-colitis was made. The autopsy revealed mesenteric thrombosis with extension to the portal vein and death had apparently resulted from toxæmia from interference with the liver function.

In the following no diagnosis was made during life.

31.—17, 1924, male, *ætatis* sixty-three, was brought in extremely collapsed and almost pulseless and died ten minutes after admission before any diagnosis could be made. The autopsy revealed atheroma of the coronary arteries and heart failure, with red granular contracted kidneys and hypertrophy of the left ventricle.

32.—2, 1925, female, *ætatis* sixty-nine, admitted on January 6, 1925, in a somewhat unsound mental condition; she became very noisy. It was impossible to get any definite history from her and she died on January 9. No diagnosis was made. The autopsy revealed arteriosclerosis, atheroma of the vessels at the base of the brain and hypostatic pneumonia.

33.—96, 1925, male, *ætatis* sixty, was admitted comatose, with no history available. There were slight cyanosis, generalized spasticity, conjugate deviation of the eyes to the left, but no other pathological neurological signs. Lumbar puncture yielded a yellow fluid under high pressure. The patient died on the day of admission. Autopsy revealed lobar pneumonia and pneumococcal meningitis.

34.—139, 1925, female, *ætatis* fifty-three, under observation for two days, was admitted comatose with a temperature of 35° C. and no history available. No diagnosis was made. Autopsy revealed the presence of cirrhosis of the liver of a rather hypertrophic form. No other cause was found for the symptoms or death.

35.—165, 1925, male, *ætatis* forty-one, a lighthouse keeper, was under observation for three days. He had had a severe headache before admission and the day previous to admission had been found semi-conscious. On admission he still had severe headache and also left facial paralysis and a rigid paralysis of the left arm and leg. There was left-sided hemianæsthesia. He was conscious and rational. On admission no Babinski's sign was obtained, but later this developed on the right side. A basal pneumonia and a purulent discharge from the nose also appeared. The cerebro-spinal fluid was under normal pressure and contained no abnormal constituents. The fundi of the eyes were normal. There were perforations of both tympanic membranes, but no pus. He had slight pyrexia whilst in hospital. The diagnosis was obscure. Autopsy showed the presence of a glioma.

36.—214, 1925, male, *ætatis* sixty-five, had had a double inguinal hernia for five years and coincident difficulty in passing water. The prostate was removed by suprapubic cystotomy. The patient did very well after the operation. On the seventh day the tube was taken out and he was apparently convalescent. He died suddenly on the eighth day without warning and from unknown cause. The autopsy showed that death was due, as was suspected though not stated, to pulmonary embolism secondary to infection of the cystotomy wound.

37.—216, 1925, female, *ætatis* twenty-eight, was admitted *in extremis*. She had had diarrhœa and vomiting on the day before admission and had collapsed suddenly on the morning of admission. She had had a baby a month previously. No diagnosis was made. Autopsy showed a general blood-stained peritonitis containing streptococci which had probably gained entrance *viâ* the Fallopian tube.

SUMMARY OF PROCEEDINGS.

THE eighteenth meeting of the Australasian Assocation for the Advancement of Science was held at Perth from August 23 to 28, 1926. Over two hundred members were present. Elaborate arrangements had been made for the reception of the visitors to Western Australia, showing that science was no less conspicuous in the administration than it was in the material submitted to the various Sections. Those who attended the meeting were loud in their praises of the organization and spoke enthusiastically of the hospitality which had been extended to them on all sides.

The induction of the President, PROFESSOR EDWARD H. RENNIE, Professor of Chemistry in the University of Adelaide, took place in the presence of His Excellency the Governor of Western Australia, Sir William Campion, and a large audience, in the Perth Town Hall on Monday, August 23, 1926.

PROFESSOR RENNIE chose as the title of his address "The Chemical Exploitation, Past, Present and Future of Australian Plants." After dealing with recent investigations concerning the structure of the atom, he dealt with the essential oils, especially the eucalypts, tracing historically the interest shown in these oils and the commercialization of the product. He also discussed the properties of oil of sandalwood, the most important of the essential oils of Western Australia, and concluded his address with a plea for a more vigorous policy of afforestation throughout Australia.

By the courtesy of the Minister for Education, the Perth Modern School close to the city boundary was placed at the disposal of the Association. This enabled the day sessions of the Sections to be centralized, each Section being allotted a class room, whilst the Central Hall provided an excellent reception room.

Before the Section of Ethnology and Anthropology, PROFESSOR WOOD JONES, of Adelaide, as President of the Section, addressed a large audience on "The Claims of the Australian Aborigine." Professor Wood Jones said that they were under a moral obligation to the race from whom they had filched this large continent, which obligation was no less because the aboriginal was placed so low on the scale of humanity that it was useless to attempt to administer Australia for his benefit. The Anglo-Saxon wherever he had invaded had attempted to overcome this moral obligation by converting the ousted native to Christianity even though the conversion to Christianity and civilization proved fatal to him. The religion and education given to the natives at the mission stations seemed to be of little or no avail and those responsible appeared to assume tacitly the truth that contact with the white race spelt the aborigines' inevitable end. He dealt with the great South Australian reserve and stated that in the whole of Australia, they had no reserve such as was understood by those outside Australia. He concluded by expressing the belief that the establishment of a chair of anthropology at the University of Sydney meant the dawn of a new era in which enlightened methods would prevail in preserving a backward race, insuring a continuance of their culture and traditions.

Before a joint meeting of the Sections of Chemistry and of Physiology and Experimental Biology, PROFESSOR T. BRAILSFORD ROBERTSON, of Adelaide, gave a survey of the present portion regarding catalysis and enzyme action. He dealt in particular with his experiments in the synthesis by enzymatic action of protein. The first impressions gained by his experiments that the end products were removed because of their insolubility, had since proved incorrect, though the experiments were successful.

Immunity reactions were called into play as the crucial tests of proof of the experiments, than which no fewer tests could be employed in the differentiation of proteins. A high concentration was needed for synthesis and the concentration of the enzyme was also high. Enzyme action was commonly said to be slow at 50°, but Professor Robertson said that he had found it possible to hydrolyse paranuclein at 70° more rapidly than at 37°. The differences in temperature were explained on the hydrolysing or synthesizing form of the enzyme.

Wosteneys and Borsook had reinvestigated the whole problem. They had adopted a new method of investigating the number of free amino (NH_2) groups compared with the total nitrogen. If synthesis occurred, the numbers of these amino groups diminished. They had tested Professor Robertson's experimental results by this method and synthesis had been found to have occurred. Their results were tabled with formulæ, but Professor Robertson drew attention to the fact that their equation was based on a polynuclear structure the wisdom of which was questionable. He expressed the opinion that an enzyme acted as a carrier of water and was present in both forms, anhydrous and hydrated, and that the reaction could be controlled by concentration and temperature.

PROFESSOR W. A. OSBORNE, as chairman of the session, agreed with Professor Robertson that the immunity test was final in that it proved that the animal had received the product injected as a protein.

DR. EVERITT ATKINSON, Commissioner of Public Health in Western Australia, read a paper before the Section of Sanitary Science and Hygiene on "Public Health Education and the Development of the Health Sense" (see page 654).

In the Perth Town Hall on August 24, 1926, in the presence of Sir William Campion, PROFESSOR BRAILSFORD ROBERTSON held the interest of a large audience whom he addressed on "The Duration of Life."

He maintained at the outset that though they were compelled to accept death as inevitable, they might at least gain he spiritual satisfaction of striving to understand the causes underlying death and in this way stave off for a time at least what might or might not be "the evil day." Though a life without risk was impossible in the world, an end was ordained for even a reckless life. This inevitability of death was not due alone to accumulation of adverse circumstances, but as much to loss of ability to withstand these. The expectation of life at any age had increased very considerably through the past centuries and this alone was a measure of civilization, probably the best standard of measure of civilization that they could obtain. Naturally as age increased expectation of life decreased until at a ripe old age it mattered little whether the environment had been a healthy one or not. Such was the inevitability of death. The crushing mortality of the Romans was instanced by the speaker who contended that man had become constitutionally fitter to survive or better able to organize his civic environment, both contentions pointing to a process of evolution and progress.

Dealing further with the inevitability of death, Professor Robertson remarked that knowledge of embryology yielded the same information because of the inability of the organism to withstand the mischances assailing it. Of the three layers the endoderm was the oldest tissue in the human body and represented the opening of man's evolutionary history and when deaths were traced through their causes in the various organs, it was apparent that a large preponderance of deaths was due to the failure of man's endoderm, less to his mesoderm and least to his ectoderm. Yet these failures in themselves would not account for the mortality of man, were it not that there was an inborn weakness. There was a fundamental cause of death which lay not outside but within man.

It was shown many years ago that the unicellular animals, such as the amœba and infusoria, were potentially immortal. Recently it had been shown in unicellular as in multicellular animals that it was the association with one another in a limited volume which condemned the society to mortality. Instancing the duration of life of cartilage cells which Professor Loeb had been able to maintain by repeatedly transplanting them into younger animals, the speaker asserted that it was the compulsory association of the different kinds of cells composing the animal body which compelled them to cease reproducing themselves and so ultimately spelled death to the whole animal.

Prolongation of life had been found to be possible by the selective breeding of long-lived and short-lived animals. Life's duration was an inherited quality, a fundamental constitution being inherited which enabled the animal to withstand more or less successfully daily mischances.

Experiments upon the pituitary gland had proved that the substance had an influence on the duration of life, but even more startling were the results obtained by giving animals in their diet a superabundance of nucleic acid manufactured from animal tissues. Thus a measure of control had been established and the future would see a greater degree of control. Where this control would lead to in the problem of medical science they could not forecast.

MR. J. STEPHEN HART addressed the Section of Pharmacy on "Botany and the Status of Pharmacy."

Mr. Hart appealed to pharmacists to justify and improve the social position they held by gaining the respect of their fellows through the community service which they could and did administer and through their added knowledge. He appealed for a wider appreciation of botany by the pharmacist, thus increasing the scientific basis underlying pharmacy. "The main purpose of teaching pharmacy students botany," he said, "is to keep pharmacy on a professional and scientific level and to prevent it degenerating into mere shop-keeping."

MR. A. T. S. SISSONS, B.Sc., Director of the Victorian College of Pharmacy, gave three reasons for reading a paper on "The Cultural Side in the Education for Pharmacy," before the Section of Pharmacy. His first reason was that the Section could occupy itself with no more profitable subject than that of education; the second was that it seemed desirable that a section should be formed where the education of pharmacists throughout the country could be discussed. The speaker also felt that the extension of general education into the country centres accounted to some extent for the increased number of students in so far that parents realizing the value of education desired that their children should join some profession and extend the knowledge they had already acquired.

Mr. Sissons pointed out that there were two roads to culture, by way of languages and the like and by way of scientific subjects, but that any study must be continuous before the full benefit could be derived from it. The aim of the Pharmaceutical Colleges was to turn out graduates sound in knowledge, but also with initiative and able to live their own lives to their own satisfaction and with benefit to the community. Whilst in his opinion the curriculum at present made reasonable provision for chemistry, botany, *materia medica* and practical pharmacy, he would suggest the addition of biological science, the study of which was essential to the chemist. He concluded with the words of Huxley: "If there is any good at all in scientific education, it is that men should be trained to know things for themselves at first hand and that they should understand every step of reason of that which they do."

MR. S. BENNETT, Government Statistician in Western Australia, in addressing the Section of Social and Statistical Science, said that out of 100,000 males born there would be 33,646 surviving in Western Australia at seventy years, a lower figures than that for any other State in Australia. Tasmania, on the other hand, would have the greatest number of survivals. Mr. Bennett proceeded to point out that the average citizen of Tasmania would have, as compared to the average citizen of Western Australia, six and a half years longer to lament over their sorrows and disabilities. This difference in longevity the speaker attributed mainly to the influence of the mining industry, stating that were the figure of those engaged in the industry eliminated, the average duration of life would be the same for Western Australia as for the rest of Australia. Mr. Bennett then referred to the infant mortality in Western Australia, which in 1900 was about 120 deaths per thousand births. In 1905, the figure had risen to 162, but had continued to fall rapidly since, until the figure in 1925 was 66.

(Continued on page 670.)

The Medical Journal of Australia

SATURDAY, NOVEMBER 13, 1926.

The Scientific Ideal.

MEMBERS of the medical profession in Australia have many opportunities of keeping themselves *au fait* with the latest advances in medical sciences and of contributing their quota to the sum total of knowledge. On the one hand stand medical journals—*The British Medical Journal* and THE MEDICAL JOURNAL OF AUSTRALIA which they receive in virtue of the membership of the British Medical Association, and any of the specialist journals to which they care to subscribe. On the other hand are the several congresses which they have the opportunity of attending. The latter cover a wide range of subjects and concern the medical practitioner in his various spheres of activity. He can afford to neglect none of them. The Australasian Medical Congress (British Medical Association) is devoted to the scientific side of preventive and curative medicine. Those attending this congress meet as members of a brotherhood founded in 1832 by Charles Hastings—a brotherhood whose primary object is the furtherance of medical science. In this regard the second session to be held shortly in Dunedin gives promise of attaining a high standard. Then there is the Australasian Association for the Advancement of Science which held its eighteenth meeting recently in Perth. Here medical practitioners can meet those interested in those other branches of science and matters of importance to Australia as a nation are discussed. This issue of the journal is devoted to some of the papers read at the eighteenth meeting. The articles by Dr. F. S. Hone, Dr. J. H. L. Cumpston, Dr. R. C. Everitt Atkinson, Professor W. A. Osborne and Professor J. B. Cleland are valuable contributions and we take this opportunity of thanking Dr. A. B. Walkom, the Secretary of the Association, for his permission to publish them. The Pan-Pacific Congress must also be mentioned. The session held in Melbourne and Sydney in 1923 showed that there were many problems that concern medical practitioners from an international point of view, problems that lie at Australia's door and that concern her both directly and indirectly.

The intelligent reading of journals and attendance at congresses are but means of keeping in view the scientific ideal which should actuate every medical practitioner. The late William Osler once wrote:

> To the physician particularly a scientific discipline is an incalculable gift, which leavens his whole life, giving exactness to habits of thought and tempering the mind with that judicious faculty of distrust which can alone, amid the uncertainties of practice, make him wise unto salvation. For perdition inevitably awaits the mind of the practitioner who has never had the full inoculation with the leaven, who has never grasped clearly the relations of science to his art, and who knows nothing, and perhaps cares less, for the limitations of either.

Science, *scientia*, knowledge, is an exacting mistress. Desired by many and sought in earnestness by a few, she is possessed entirely by none. Attractive, elusive, capricious, but withal compelling, she communes awhile with those who seek her with most persistence.

The maintenance of a scientific ideal demands a certain and constant attitude of mind. It is not a garment that can be assumed and shed at will. He who loses sight of it, will surely retrogress. He will be like the craftsman who allows his calling to degenerate into a trade. There is no doubt that the present tendency among many medical practitioners is to drive a trade instead of following a craft. The fact is deplorable, but none the less real. It is necessary only to compare the small attendance at a meeting called for the purpose of discussing the pathogenesis of some well known clinical condition with the eager and attentive crowd which flocks to talk about raising the capitation fee for lodge patients or to discuss the charging of private fees for persons insured under an industrial act. The cry is heard that meetings and journals are too scientific. The "inoculation of leaven" mentioned by Osler has not stood the test of time. The scientific ideal has been displaced and forgotten. Another series of inoculations needs to be made. A second response to the leaven can be obtained, but not so readily as in the early days. It takes longer before the leaven "leaveneth the whole lump." The process

calls for watchfulness and self discipline. Helmholtz spoke of:

The truth which has never been deceived—that complete truth which carries with it the antidote against the bane and danger which follow in the train of half-knowledge.

This is the ideal to be sought. The message at the present time may be summed up in a few words: Cultivate the right attitude of mind by the careful, regular and discriminating use of medical journals. Regard congresses as essential to the attainment of the scientific ideal and if you have not already done so, make a start in this direction by coming to Dunedin in February next.

Though none will attain it, all may strive for that completeness of vision of which Francis Thompson, once a student of medicine, has sung:

> When thy seeing blindeth thee
> To what thy fellow-mortals see;
> When their sight to thee is sightless;
> Their living, death; their light, most lightless;
> Search no more—
> Pass the gates of Luthany, tread the region
> Elenore.

(*Continued from page 668*)

PROFESSOR A. MACKIE and PROFESSOR J. SMYTH spoke in the Section of Mental Science and Education on the subject of general ability tests in schools and colleges. Professor Mackie said that although the examination of school pupils occupied a very considerable portion of the time spent in education, little attention had been given formerly to the study of examination. There were no textbooks on the subject, but in the last few years the importance that had been placed upon tests of general ability had directed attention to this aspect of teaching.

Professor Smyth said that it ought to be possible to select pupils for courses of higher education by the intelligence group tests which were being used to determine whether a child was placed in the right class at school. The following conclusions were summarized: A student who was ranked in the lowest 25% of the secondary students by the tests scores, was unlikely to do more than pass work in the university; the university courses of those students whose tests scores were below the medium score of their group, should be chosen with great care; when it was proposed to raise students from the primary course to the secondary, the intelligence test scores of these students should be accepted as a reliable indication of their ability; when a student's examination results or his tutor's reports were not as good as the best results would lead one to expect, the case should be closely investigated; Spearman's neogenetic principles formed a sound basis for the construction of intelligence tests for adult students; the students of a group, however large, could be tested and rated within an hour; when the best score and the examination results differed considerably, the test score was the more reliable criterion of the student's ability.

PROFESSOR H. DARNLEY NAYLOR, Lecturer in Classics at the University of Adelaide, delivered a popular lecture on "Blondes and Brunettes in Antiquity." Some ethnological truths were to be seen in the Adelphi drama in London. Here the hero was tall, fair and rather stupid in appearance, whilst the villain was dark, slight and inordinately clever. In mediæval description, the lords and their ladies were fair, whilst their churls and knaves were dark. In Italian paintings the good were depicted with light hair, the bad with dark. A fair-headed Christ was usually depicted between two dark-haired thieves. At the first sight of English slaves Pope Gregory exclaimed: "*Non Angli sed angeli.*" None but the boldest painter would infringe the rule by depicting a saint with black hair. From literature the speaker judged that the Romans had no great liking for brunettes and Horace stood almost alone in his admiration of this type. Were a slave born in the palace with red hair, a miraculous happening was suggested to hush up the scandal, the usual explanation being that the hair had burst into flames which had been extinguished with water. Along the line of emperors the Nordic colouring became more prevalent. Though it appeared to be difficult to draw any authoritative conclusions from study of the Ancient Greeks, the "yellow" (ξανθὸς) epithet was applied to their warlords, heroes and heroines, whilst the term black-haired seemed to have been reserved for special purposes. Later on the hair was dyed yellow by the upper classes to distinguish them from the lower. Up to the third century before Christ the admiration for yellow persisted. The speaker inclined to the opinion that it was not founded on some mysterious choice or instinct, but arose from respect for and a desire to imitate the superior families who, migrating from the north in the first place to harry and plunder, settled down to dominate the countries of their adoption. It would be perilous to forget, however, that no valuable contributions to either art or literature had been made by the pure Nordic descendants. The Spartans were splendid homicides, no more. It was a mixed race that made Athens great and it was the same fusion of Nordic and Mediterranean that had produced the British commonwealth of nations.

The Training of Opticians.

The question of the training of opticians was discussed before the Section of Astronomy, Mathematics and Physics, MR. KETT, President of the Australasian Optometrical Association, opening the discussion.

Mr. Kett maintained that optometrists were an essential factor in modern society, as probably 90% of all eye testing was performed by them. The detection and correction of visual defects was a most important factor in modern life; the social and economic demands made upon people's eyes had increased. Almost every man or woman needed the aid of glasses with advancing years. Three out of every ten wore them for other reasons, but seven out of every ten needed them. Mr. Kett outlined the history of glasses as an aid to vision, giving the credit of first mention to Roger Bacon. Alexander de Spina reinvented spectacles at a slightly later date; the first medical practitioner to refer to glasses was Bernard de Gordon, of Montpellier, in 1302, almost a hundred later. It was not until about 1500 that the earliest known glasses were made.

PROFESSOR A. D. ROSS during the course of the discussion said that he was convinced that in the interests of the residents of country towns it was desirable that sight-testing opticians should be fully trained and registered. He had discussed the proposal with Dr. Morris, Inspector-General of Hospitals in South Australia, who favoured a university training of optometrists, but did not favour a training in hospitals in pathology. Professor Ross felt that the objections that had been raised against the training and registration of optometrists were similar to those that had been raised previously to the training of dentists.

MR. A. KNAPP said that he believed that if opticians sent all patients who presented any deviation from the normal for medical examination, they would receive the support of the medical profession.

PROFESSOR KEVE GRANT announced that the University of Adelaide proposed to start in a small way by arranging a course of elementary optics for optometric students.

Sanitation of Offices and Workshops.

DR. D. G. ROBERTSON, Director of the Division of Industrial Hygiene in the Commonwealth Department of Health, delivered a public address on the sanitation of offices and workshops. He dealt with the details of lighting, heating and ventilation. The address was freely illustrated with lantern slides and demonstrations. Dr. Robertson said that while 18·3° C. was regarded as an ideal temperature for Australians, many offices and workrooms were veritably tropical in summer, hot, humid and still. In warm weather it was essential to keep the air moving, electric fans proving useful for this purpose. The air intake of one room should not come from another room, but from the fresh air outside. The floor level of air should be warm with the cold fresh air circulating at breathing level. The physical condition of the air, namely its temperature, water content and mobility, was much more important than its actual purity.

Dr. Robertson maintained that correct lighting was a great factor in the well-being of the workers and in production. In dealing with electric lighting he stated that it was common to see lamps of the most modern construction in shades that had been obsolete for ten years, the result being the production of glare which was one of the most common fault in artificial lighting. Whereas a bluish light gave the impression of a cooler atmosphere than the thermometer indicated, a yellow and orange lighting gave the opposite effect. Dr. Robertson referred to high level lighting under which any one would find it easier to work than under many of the more modern methods in use. Light was properly directed when it was evenly distributed, giving soft and luminous shadows, which was not the case in the direct system of lighting by drop lights with unsuitable reflectors and unfrosted globes. Dr. Robertson said that the room in which he was speaking was a very good example of how a room should not be lighted. The extra cost of installing a proper system of lighting in any office or workroom was more than repaid by the increased production which resulted. The liability to accidents was lessened and the spoilage of material reduced, while labour discontent was minimized by the congenial working conditions.

Child's Reading Matter.

MR. LONG read a paper before the Section of Mental Science and Education on the problem of the Australian child reading matter. He pointed out that the contents of school reading books had been controlled by the ideas of contemporary civilization. Whereas at first the English school books had dealt more or less exclusively with scriptural subjects, secular matter gradually replaced the scriptural till little if any remained. At first readers had been imported, but articles of Australian interest had been gradually added till each State had its own readers and continuous school papers. The ideal, in the opinion of the speaker, might be a series of readers, choice literature, including a fair proportion by Australians; continuous readers, several of which should treat of Australian life and nature; a school paper; a well organized library. The first was necessary, not to supply information, but to provide literature of power and encourage power of thought; the second to aid in the ability and desire to read books, while the library, wisely chosen and augmented from time to time, should be looked upon as an essential. The school paper should be informative and should be designed for creating and developing the interest of young people. While Mr. Long felt that it would be unwise to have uniform reading matter throughout Australia, he thought that the Federal Government might with advantage supply with the advice of the State authorities a certain amount of reading matter to spread information concerning Australia, to combat State jealousies and to foster a national spirit. The problem of the Australian child's reading matter, while not settled, still called for earnest thought and consideration.

PROFESSOR J. BURTON CLELAND read a paper entitled "Vital Statistics in the Light of *Post Mortem* Findings," before the Section of Sanitary Science and Hygiene (see page 664).

PROFESSOR W. A. OSBORNE delivered an address on the "Study of the Reflex" (see page 660).

On the Synapse Theory.

In a paper by MR. O. W. TIEGS on the synapse theory, the author pointed out that though the conception of successive neurones of a reflex arc terminating one upon the next by a discontinuous branching synapse, was widely accepted by physiologists, there was little histological basis for the conception. Ramón y Cajal alone had figured a neurone in the spinal cord terminating by a branching as ending in a nerve cell of Clarke's column. This was in a methylene blue-stained specimen, but in preparations of the spinal cord stained by the reduced silver nitrate methods the author had not seen any indication of such synapses. Mr. Tiegs pointed out that in successful preparations of the spinal cord in which the whole of the nervous elements appear stained, he would expect to find the branching synapses embracing the nerve cells in a thick cluster, but he had not found it. On the contrary he had found that the fine collaterals that entered the grey matter, penetrated the dendrites of the nerve cells and having entered the nerve cells, became continuous with the neurofibrils. It followed that the conducting unit of the nervous system must be the neurofibril and not the neurone. The author commenting on methylene blue preparations made the statement that they abounded in artefacts, due to the fact that they were not subjected to fixation; they were therefore unreliable.

British Medical Association News.

MEDICO-POLITICAL.

WE have been requested by the Council of the Queensland Branch of the British Medical Association to publish the following letter which has been sent to the members of the Branch.

DEAR SIR: With a view to more efficient organization of districts outside the metropolitan area, we are endeavouring to inaugurate a scheme whereby the State will be divided into areas or groups of towns which are associated together by railway or motor car and are all more or less connected with one particular town in the group.

I am enclosing herewith a map[1] with the suggested areas marked out. If you or any other member think there should be any alteration as regards the suggested boundaries, please let me know.

It is proposed that a member residing in the town chosen as the centre, be appointed for each area to act as district representative who could be elected annually by postal ballot. The various groups would be divided up amongst certain members of the Council and such members would make it their business to keep in close touch with the district representatives of the areas allotted to them.

I should be glad if you would kindly put this matter before the members in your district and arrange to hold a ballot to elect your representative. Any out of pocket expenses incurred by you in the organization of your district will be refunded by us.

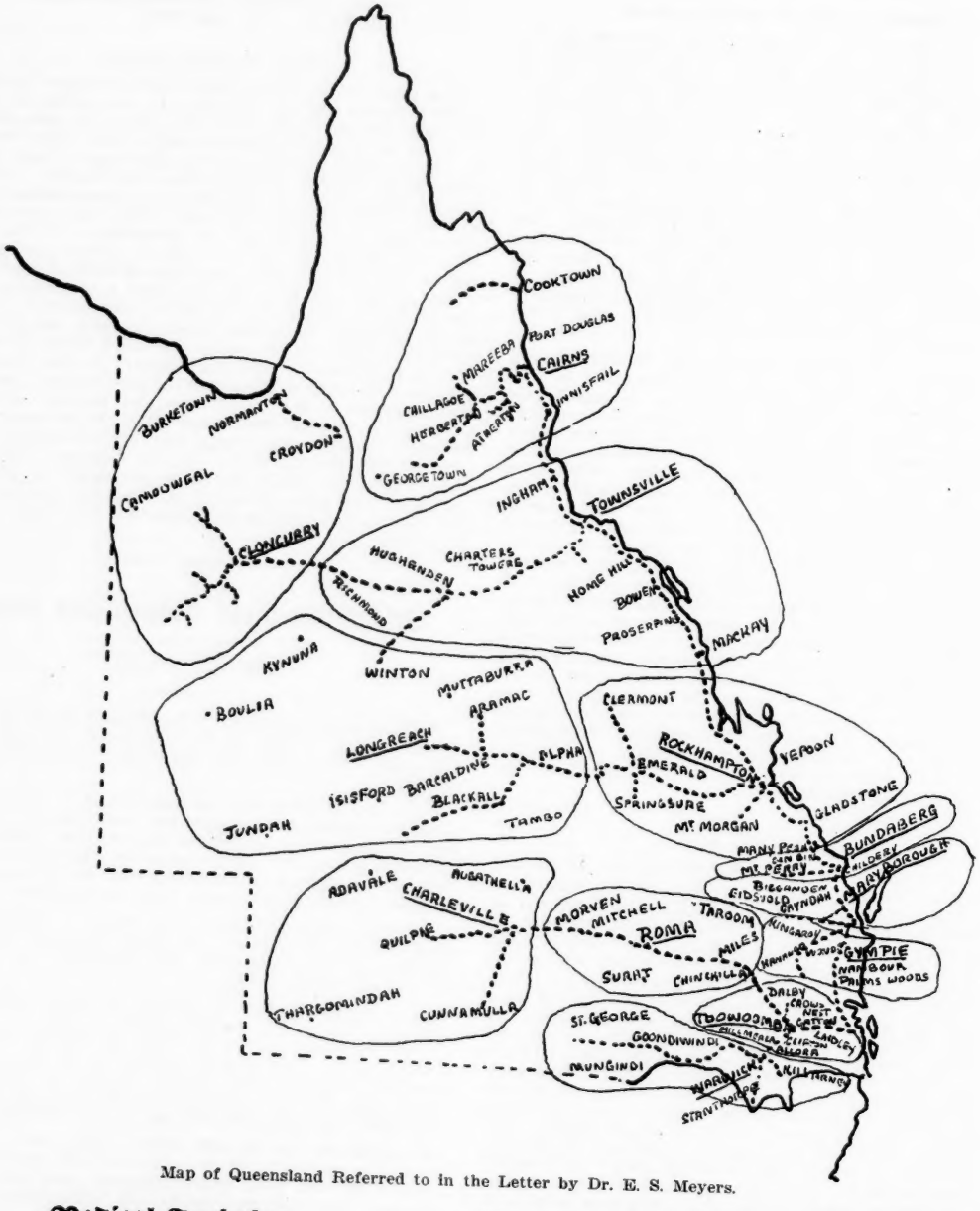
In the event of our wishing to obtain the opinion of the profession rapidly on any matter, the chosen representative will be able to get in touch with the men far more quickly than the Branch in Brisbane.

Yours faithfully,

E. S. MEYERS,
Hon. Secretary.

P.S.—This organization is not intended to supplant any local association already in existence or any organization forming as a result of my letter of May 12, 1926, but will be merely an extension of such bodies.

[1] See page 672.



Map of Queensland Referred to in the Letter by Dr. E. S. Meyers.

Medical Societies.

THE MELBOURNE HOSPITAL CLINICAL SOCIETY.

A MEETING OF THE MELBOURNE HOSPITAL CLINICAL SOCIETY was held at the Melbourne Hospital, on August 27, 1926, MR. ALAN NEWTON in the chair.

Inflammatory Swelling in the Neck.

DR. J. DAVIES presented for Mr. Harold Dew a male patient, aged thirty-seven years, a miner, who for eighteen months previously had noticed in the region of the angle of the left jaw a small, hard swelling about the size of a pea. This had gradually increased in size and eight months ago was operated on in the country. The wound did not heal and a discharge had persisted ever since, while the area affected had become much more extensive. From time to time, soft, red, painful, fluctuant areas appeared and ultimately broke down leaving persistent sinuses. Dr. Davies pointed out that the discharge was thin and profuse, but contained no "sulphur granules." On examination there was a large irregular swelling, extending from the mastoid process to the clavicle, hard in parts and soft in others and with numerous discharging sinuses. The discharge had been repeatedly examined for actinomyces, but none had been found and culture had yielded no growth. X ray examination of the cervical region of the spine revealed nothing abnormal. Potassium iodide up to two grammes (thirty grains) three times a day had been given and an iodide rash appeared, but there was no improvement. Tincture of iodine 0·36 cubic centimetre (six

minims) three times daily had then been tried but with no effect. Mr. Dew asked for suggestions with regard to diagnosis and treatment and for an expression of opinion as to the advisability of using Callot's paste.

MR. VICTOR HURLEY said that in his opinion the condition was actinomycotic, because of the characteristic hard and soft areas, the multiple sinuses and the tendency to spread towards the mediastinum. Organisms were frequently absent from the discharge and might be found only on a microscopical examination of the tissues. He had seen a similar patient improve rapidly after a few exposures to X rays. Good results had been reported from the use of copper sulphate, but he had no personal experience of its use.

DR. HOWARD PRAAGST said that he had treated four cases of actinomycosis with X rays, but the results had been disappointing.

Dental Cyst.

MR. C. H. OSBORNE showed a female patient, aged fifty, who ten years previously had noticed a small swelling on the alveolar border of the left mandible. Six months before the meeting this had begun to increase in size. There had been no pain. All the teeth behind the canine on that side of the jaw had "fallen out." On examination there was in the body of the left mandible a swelling about five centimetres in diameter, smooth not tender and fluctuant along the alveolar border. X ray examination showed an area of absorption in the body of the left mandible about five centimetres long with well defined edges except in the upper portion where the alveolus was completely eroded. In the lower part there was chronic cystic change. Mr. Osborne pointed out that odontomes were divisible into three groups, the epithelial, the composite and the connective tissue. The epithelial were further subdivided into dental cysts, dentigerous cysts and multilocular cysts or fibro-cystic disease. The multilocular cysts were usually associated with a history of an absent tooth. The follicular or dentigerous cysts showed on X ray examination a tooth attached to the wall of the cyst. The dental cysts were of uncertain ætiology, but were probably a result of infection and consequent epithelial proliferation at the root of a tooth. Although no tooth root was present in this case, he regarded it as being probably a dental cyst. He thought that the epithelial lining of the cyst should be completely removed, as otherwise a persisting sinus might develope. He asked for an expression of opinion with regard to the treatment of the cavity, whether it should be collapsed or plugged and also as to the nature of the pathology.

MR. VICTOR HURLEY concurred with the diagnosis of dental cyst and with the view put forward as to its pathology. He had seen a similar case in a male, aged twenty-six. At operation an incision had been made beneath the ramus of the mandible, a small window was cut in the bone and the whole cyst wall completely removed; the wound was then closed. X ray examination, made at intervals during the next six months, had revealed considerable regeneration of bone and complete filling in of the cavity. A microscopical examination of the cyst wall showed it to be composed of stratified epithelium and fibrous tissue.

Temporo-Sphenoidal Lobe Tumour.

MR. BASIL KILVINGTON and DR. S. V. SEWELL showed a female patient, aged sixty-four years, who had been admitted to hospital on August 1, 1926. Two months previously she had noticed numbness in the left half of the upper and lower lips, at first momentary and occurring three or four times daily and then later increasing in frequency and duration. In the last few months her vision had gradually diminished and this had not been relieved by glasses. Six months previously she had noticed sharp pain in the left shoulder, passing gradually to the lower part of the back and persisting as a dull ache over the lower part of the spine. In the last few weeks she had had hallucinations of taste and smell and at times had experienced peculiar clanging noises in the head. One week before admission she had suddenly developed clonic movements of the left side of the face, jaw and left hand, lasting for ten minutes and occurring at the rate of sixty per minute. She had then fallen down and could not rise for five minutes, but did not lose consciousness. For several days after this she had had regular attacks of mandibular clonus every two or three hours. On examination the pupils had been equal and reacted to both light and accommodation. The reflexes in the upper limbs had been equal and active. The knee jerks and ankle jerks had been more active on the left side, the plantar reflexes were both flexor, but on one occasion after an attack of twitching the left plantar was extensor and there was some weakness on the left side of the body. The left superficial abdominal reflex had not been as active as the right. There had been an upper motor neurone paralysis of the left side of the face and the tongue on protrusion deviated to the left; there was some asteriognosis in the left hand. Ophthalmoscopic examination had revealed definite blurring of both discs, the veins were fuller than normal and there was slight papillœdema; contraction of both visual fields on the temporal sides was present. The cerebro-spinal fluid had manifested no increase in cells or globulin until did not react to the Wassermann test. The blood, however, had reacted strongly to the Wassermann test. A full examination of the other systems in the body had revealed nothing abnormal. Dr. Sewell had diagnosed a right temporo-sphenoidal tumour and advised operation. He said that in his experience a cerebral tumour in the early operable stage rarely, if ever, gave rise to optic neuritis. Mr. Kilvington had trephined over the right temporo-sphenoidal region. On opening the skull there had been no increase in pressure and no dural adhesions. On incising the dura a small, circular, dark-coloured tumour about the size of a shilling had been exposed. The tumour had been of about the same consistency as the cortex and was not definitely encapsulated. After ligation of a few surrounding vessels it had been completely removed and was found to be about six millimetres in thickness. The wound was then closed in the usual manner. Microscopical examination of the tumour showed it to be an endothelioma. After operation there had been some twitchings in the left arm and face and also peculiar clonic movements of the right hand which were difficult to explain. There was also weakness of the left side of the body, probably due to œdema and displacement of brain tissue. Mr. Kilvington had had experience of a similar case about twelve months ago and considered the prognosis to be fairly good.

MR. ALAN NEWTON congratulated Mr. Kilvington on the result obtained. Recent investigation of gliomata had shown that there were about ten varieties with striking differences in their histological structure, dependent on the particular cells in the neuroglia from which they sprang. Some, particularly the astrocytomata, were comparatively non-malignant and it was therefore wise to remove infiltrating tumours on the surface of the brain. The long survival seen in some cases after decompression was explained by the comparative innocence of many gliomata.

Genito-Urinary Tuberculosis.

MR. J. T. TAIT presented two patients suffering from genito-urinary tuberculosis. The first patient was a Chinese boy, aged fifteen years, who had recently arrived from China. The urine had contained blood, pus and tubercle bacilli. Cystoscopic examination had revealed a generalized inflammation of the bladder with ulcers and tubercles equally distributed around both ureteric orifices. Indigo carmine had appeared from the right ureter in twenty minutes and none from the left in half an hour. The ureters had been catheterized and tubercle bacilli had been found in the urine obtained from the right ureter and none in that obtained from the left. The blood had contained twenty milligrammes of urea per hundred cubic centimetres and the urine, obtained two hours after the administration of fifteen grammes of urea, contained 2% of urea. The right kidney and the surrounding perinephric fat which was also infected, had been removed. The ureter had been divided as far down as possible and the thickened stump which remained, was cauterized. The wound had then been closed, a small wisp of gauze being left in for twenty-four hours; healing took place by first intention.

The removed kidney was exhibited at the meeting and showed extensive active tuberculosis of the ulcero-cavernous type. At the time of the meeting, three months after the operation, the patient still had tuberculous lesions in the bladder, there was early but definite involvement of the prostate and *lupus vulgaris* in the skin around the anus. The epididymis was not affected. Mr. Tait asked for an expression of opinion as to the advisability of giving tuberculin.

Mr. Tait's second patient was a male, aged twenty-five years, who eighteen months previously had begun to pass blood and pus in the urine. He had had repeated attacks of renal colic on the left side, which appeared to be brought on by exertion. On cystoscopic examination the bladder had been normal; indigo carmine appeared from the right ureter in five minutes, but none from the left in half an hour. In attempting to catheterize the left ureter, Mr. Tait had been able to introduce the catheter for only a short distance. X ray examination after the injection of sodium iodide into the left ureter had revealed a stricture just above the opening into the bladder with dilatation of the ureter above it. The left kidney had been explored and found to contain many smooth-walled cysts filled with slightly milky fluid. A nephrectomy had been performed and the wound closed. Microscopical examination of the kidney did not definitely establish the cause of the pathological process, but a guinea pig, injected with a little fluid from a sinus which appeared in the wound, manifested tuberculosis.

MR. B. KILVINGTON said that in the first case the *lupus vulgaris* around the anus was probably due to infection from the urine. In the second case he had thought at operation that the condition was not tuberculous because the cysts were smooth walled and shiny and not ragged, as was usually the case in tuberculosis. It was evidently a very chronic infection. He thought that the outlook in renal tuberculosis was better in females than in males, because there was no prostate gland to become infected.

DR. S. V. SEWELL said that in his experience the results of nephrectomy in renal tuberculosis were good. Patients treated with tuberculin had not done well and most of them had subsequently required operation. After operation, however, he thought that tuberculin was often very useful. He instanced one patient who had had a mild tuberculous lesion at the right lung apex for two years. He had then had a high temperature and manifested lesions in the glands of the neck, the right knee joint, the right kidney and the left epididymis and testis. The glands in the neck had first been removed, then the left testis and later the right kidney. Subsequently three vertebræ had become involved and the patient was placed on a double Thomas splint for three months. At this time his temperature had been about 37·8° C. (100° F.) every night. The von Pirquet test had yielded a strong reaction with bovine, but only a slight reaction with human tuberculin. He had been given bovine tuberculin beginning with a dose of one one hundred thousandth of a milligramme and gradually working up to one one hundredth of a milligramme with very beneficial result.

Polycystic Disease of Both Kidneys.

Mr. Tait's third patient was a male, aged thirty-five. Three weeks previously he had fallen from a motor bicycle on to his left loin. A week previously he had received a blow in the same region and two days later had hæmaturia, accompanied by some pain in the left loin. There were no other symptoms. The urine contained albumin, blood and casts, but no pus. There was a large mass in the left loin presenting the features of a renal tumour and the right kidney was also enlarged. Pyelograms of both sides revealed elongation of the renal pelvis with very little change in the calyces. Mr. Tait pointed out that the history was typical of that usually seen in polycystic disease of the kidneys. In the literature there was very little reference to the appearances seen in the pyelogram in proved cases of the condition.

MR. B. KILVINGTON mentioned one patient who had complained of hæmaturia and renal colic. The pyelogram revealed elongation of the renal pelvis. The kidney was explored and found to be polycystic. He thought that large polycystic kidneys were peculiarly liable to injury because of their size. He had operated on two which had ruptured.

DR. W. W. S. JOHNSTON drew attention to the hereditary tendency seen in some cases of polycystic disease. In one family, traced through four generations, there were among forty-two individuals eight definite and two doubtful cases. Most of the patients lived to about the age of fifty, but symptoms, particularly pain and hæmaturia, might appear much earlier at about the age of twenty. In many cases, too, myopia was present.

DR. S. V. SEWELL said that he had observed the disease in a mother and her daughter, aged twelve years.

Nephritis.

DR. S. V. SEWELL showed a male patient, aged twenty-five years, who had been admitted to hospital on August 8, 1926. He had had rheumatic fever five years previously, but gave no history of any other illness. Three weeks before admission, he had become feverish, sweated at night and had some pain in the left knee. Under treatment with sodium salicylate the pain and sweating soon ceased, but the fever had persisted and was accompanied by nocturnal vomiting. His throat had then become sore and he noticed that he was becoming paler. During the four days prior to admission there had been almost complete anuria, the vomiting at night was very severe and he felt very weak. For the previous two days he had had diarrhœa. On admission he had looked very anæmic and there was slight puffiness of the face. The temperature had been 36·6° C. (97·8° F.), the pulse 65 and the respirations 24 in the minute. The tongue was dry and covered with a brown fur. The diastolic blood pressure was 65 and the systolic 135 millimetres of mercury. A catheter had been passed and only thirty cubic centimetres (one ounce) of urine was obtained. It had been acid in reaction, smoky in appearance and loaded with albumin. Microscopically it had contained numerous red blood corpuscles, epithelial cells and hyaline casts. The cardiac apex had been in the fourth intercostal space ten centimetres (four inches) from the middle line; at the mitral area systolic and diastolic murmurs could be heard. The optic discs had been blurred by œdema but there were no hæmorrhages or deposits. There had been slight œdema of both ankles. Physical examination had revealed no other abnormalities. Fluids had been given freely by the mouth with 6·5 grammes (one hundred grains) of compound powder of jalap. Hot cups had been applied to the loins and the patient was placed in an electric bath. The next day treatment had promoted good skin actions, but he passed only thirty cubic centimetres (one ounce) of urine. The blood contained 369 milligrammes of urea per hundred cubic centimetres. The following day he had passed sixty cubic centimetres of urine (two ounces), and his blood contained 359 milligrammes of urea per hundred cubic centimetres. The same evening Mr. Newton had decapsulated the right kidney; it was very much enlarged and bled freely when the capsule was stripped. The following day no urine at all had been obtained. Saline enemata had been given but were persistently returned. Enemata containing 50% of magnesium sulphate were also given, but with only moderate results. He was having good skin actions and drinking fluids well although the vomiting persisted. The following day thirty cubic centimetres of urine had been obtained and the blood contained 333 milligrammes of urea per hundred cubic centimetres. During the next two days the patient seemed quite bright, his vomiting had ceased, and he was taking fluids well. At 8.30 the next morning he suffered from epistaxis which was allowed to continue and did so till 12 noon. At this time his condition seemed unchanged. At 12.30 p.m. he had complained of feeling queer, his right arm and face commenced to twitch and he died within a few minutes. The blood taken twenty-four hours before death contained 409 milligrammes of urea per hundred cubic centimetres. *Post mortem* examination revealed some thickening of the myocardium and the mitral cusps. The lung bases were slightly congested and the left lung was œdematous. The Malpighian corpuscles in the spleen were enlarged. The right kidney weighed 283·5 grammes (ten ounces) and the left 311·6 grammes (eleven ounces). The capsule of the left kidney peeled easily. The surface of both kidneys

was smooth and red. On section the cortex was swollen, had a peculiar granular appearance and was well demarcated from the medulla which was red throughout. Microscopical examination revealed large hæmorrhages and much cellular infiltration, mostly by mononuclear cells and young fibroblasts, affecting both the glomeruli and the interstitial tissue. The tubular epithelium appeared to have been but slightly affected. The pleural and peritoneal cavities each contained about half a litre of straw coloured fluid. All the other organs appeared to be normal. Dr. Sewell asked for an expression of opinion if it would have been wise to have decapsulated both kidneys instead of only one and whether a free venesection with removal of two and a quarter litres (four pints) of blood followed by replacement of the same amount by transfusion would have been advisable. He felt that if these measures had been adopted, the patient might have recovered.

DR. L. E. HURLEY said that he believed decapsulation to be of value in acute nephritis. Patients suffering from this disease, even when desperately ill, might recover under medical treatment. It was therefore very difficult to decide at what time and in what cases the operation was indicated. If operation were undertaken early, many patients would be unnecessarily subjected to surgical treatment, whereas if operation were delayed till late in the disease the patient might not be able to stand it. He did not think it would have been wise to have decapsulated both kidneys of the patient under discussion. He also doubted whether free venesection followed by transfusion would have saved the patient.

DR. W. W. S. JOHNSTON said that latterly cupping seemed to have fallen into undeserved disfavour. He thought that it might be used more frequently with benefit.

DR. K. D. FAIRLEY said that in acute cases when a rapid estimation of the blood urea might be necessary, the method advocated by Aldrich and Hench was very useful. The test could be completed in half an hour, but there was the disadvantage that ten cubic centimetres of blood were required.

Dr. Sewell's second patient was a female, aged twenty-nine years, who had first come under observation on February 2, 1926. Six years previously she had had eclampsia. She had had no other illnesses. Since the eclampsia she had had at intervals ten series of epileptiform fits, the last being three weeks before admission. During the past few years she had got very thin and was troubled with headaches which were gradually becoming more severe. She had had generalized œdema on two occasions, the second just before admission. She had been passing urine four or five times during the day and two or three times at night. On examination she was very thin and pale. The systolic blood pressure had been 270 and the diastolic 180 millimetres of mercury. The urine had a specific gravity of 1020, was acid and had contained albumin and granular casts. The cardiac apex had been in the fifth intercostal space twelve and a half centimetres from the mid-line and there was one finger's breadth of heart dulness on the right side, the second sound was accentuated all over the præcordium. A concentration and dilution test had revealed a maximum specific gravity in the urine of 1032 and a minimum of 1000. The blood urea had been determined on three separate occasions and was found to be respectively 29, 33 and 28 milligrammes per 100 cubic centimetres of blood. Two urea concentration tests had been done and the results were 1·55% and 2·5% respectively. An examination of the eye grounds had revealed large areas of exudate in both retinæ, the optic discs manifested four diopters of swelling, the arteries were almost completely blocked and there was occasional segmentation of blood in the veins. After being in hospital three weeks the patient had been discharged unimproved. She had been readmitted a fortnight later on April 17, 1926. Since leaving hospital she had been fairly well except for occasional headaches. On the morning of her readmission she had had an epileptiform fit, after which she was for a time semi-comatose. The urine had manifested a specific gravity of 1016, was acid and contained albumin (0·2%) and granular casts. The blood urea was 47 milligrammes and ten days later 27 milligrammes per hundred cubic centimetres. After being in hospital for nearly a month she had again been discharged, slightly improved. Four months later she had been readmitted in a comatose condition, with severe vomiting, pallor and wasting. The systolic blood pressure had been 244 and the diastolic 196 millimetres of mercury. The blood had contained 84 milligrammes of urea per hundred cubic centimetres and the urea concentration test gave a reading of 1·37%. An examination of the fundi showed that the papillœdema had practically disappeared. Secondary atrophy was present in the left optic disc and there were several patches of chorioidoretinitis in each eye. The maculæ were clear and the large patches of exudate had disappeared. The patient had remained in a semi-comatose condition for nine days and then died. *Post mortem* the kidneys were very pale, rather small, the capsules stripped with difficulty and the surface contained numerous small depressed patches. The cortex was wide, quite white and not well demarcated from a pink medulla. The kidney substance was very tough and the vessels were prominent. There was also chronic inflammation of the endometrium and the Fallopian tubes, both of which contained pus. The coronary arteries were thickened and the aorta manifested some atheroma.

Dr. Sewell's third patient was a female, aged thirty-two, who had been admitted to hospital on August 11, 1926. She had had *hyperemesis gravidarum* during her first pregnancy; three years ago she had had diphtheria and ever since had been very weak and on the slightest exertion would become short of breath. At times her ankles had been swollen. For the previous five years she had had to get up at night to pass urine and during the last three weeks had been getting up about thirteen times every night. This frequency had not been so pronounced during the day. In the last eight weeks she had had intermittent vomiting and in the past three weeks this had been more frequent, she had been very short of breath and had become progressively weaker. On admission she had been drowsy and a history was obtained with difficulty. Her speech had been very thick and her complexion sallow, the breath was very foul and the tongue dry and dirty. The temperature had been 36·1° C. (97° F.), the pulse 92 and the respirations 20 in the minute. The systolic blood pressure was 165 and the diastolic 100 millimetres of mercury. The urine had had a specific gravity of 1012, was acid and contained albumin and hyaline and granular casts. The eye grounds had manifested slight papillœdema with hæmorrhages and a few ill defined woolly patches. The blood had contained 342 milligrammes of urea per hundred cubic centimetres and the urea concentration test gave a reading of 0·92%. An examination of the heart, lungs, abdomen and central nervous system had revealed nothing abnormal. She had been given 2·6 grammes (forty grains) of compound powder of jalap, 50% magnesium sulphate enemata, free fluids by the mouth and an electric bath. She had rapidly improved and eight hours after admission her drowsiness had disappeared and her speech was quite clear. A concentration and dilution test revealed a maximum specific gravity in the urine of 1014 and a minimum of 1008. A fortnight after admission her blood contained 375 milligrammes of urea per hundred cubic centimetres, but she said she felt better than she had for years and desired to go home. Dr. Sewell commented on the contrast exhibited by the last two patients, the former dying with a comparatively low blood urea and the latter feeling well with the blood urea still at a very high figure.

DR. W. W. S. JOHNSTON said that in some cases of arteriosclerosis renal changes appeared only towards the end and then developed very rapidly. He thought that a toxæmia arising from the bowel might be a causal factor in some cases and that free irrigation of the bowel, followed by the instillation of fresh potassium permanganate solution, might be of benefit.

DR. L. E. HURLEY thought that the first case corresponded to the condition first described by Allbutt under the name of hyperpyesia in which the cardiovascular disease was prominent and the renal damage comparatively slight and of late appearance. Symptoms similar to those seen in uræmia were frequently present, but were probably due to cerebral arteriosclerosis. Tests of renal function often revealed very little abnormality.

Sacculated Effusion Simulating Hydatid.

DR. L. E. HURLEY showed a male patient, aged fifty-four, who had been well until three years previously, when he noticed for several weeks intermittent attacks of sharp pain in the left hypochondrium and weakness which was his main complaint. His doctor had found an easily palpable spleen. The Wassermann test applied to the blood yielded no reaction, but a strong reaction was obtained to the hydatid complement fixation test. X ray examination had revealed beneath the left diaphragm a large oval shaped mass, about twelve and a half centimetres (five inches) in diameter and with calcification at its lower margin. Hydatid cyst had been diagnosed and operation advised, but it was refused. During the next twelve months the patient's health had rapidly improved and he became quite well again and remained so until six months ago. He had then noticed that he was getting short of breath and his weakness returned. Under treatment with iron and arsenic his symptoms had disappeared and his health remained fairly good till four weeks before his admission to hospital, when he contracted influenza. Since then he had had a dry cough and considerable shortness of breath and in the last week had been orthopnœic. In the last six months he had lost about 18·9 kilograms (three stone) in weight. On admission he had looked pale and appeared to have lost weight. The temperature had been 36·1° C. (97° F.), the pulse 110 and the respirations 38 in the minute. He had been orthopnœic and his accessory respiratory muscles were forcibly acting, the tongue was moist and slightly furred, the cardiac apex was in the sixth intercostal space, 12·7 centimetres (five inches) from the middle line and there was one finger's breadth of right heart dulness. There had been two fingers' breadth of dulness to the right of the *manubrium sterni*. The heart sounds had been clear, there were occasional extrasystoles, the arteries were thickened, the systolic blood pressure was 140 and the diastolic 90 millimetres of mercury. In the left axilla there had been signs of fluid and at the left base signs of consolidated or compressed lung, a few crepitations were heard at the right base. The glands at the angles of both jaws had been slightly enlarged, but not hard and a few small hard glands were palpable in the left supraclavicular fossa. The blood had manifested a moderate grade of secondary anæmia. The result of the Casoni test, both immediate and delayed, was positive and the blood reacted strongly to the hydatid complement fixation test. X ray examination had revealed enlargement of the heart and aorta; there was also a shadow with a well defined margin running along the left axillary wall and merging with an ill defined shadow at the left base. Films of the left side of the abdomen showed no evidence of the well defined oval shadow which had been present two years previously. A week after admission there had been slight œdema of the feet and definite signs of ascites and the heart dulness had increased to two fingers' breadth. A diagnosis of cardiac failure, complicated by a hydatid cyst of the left lung, had been made and it was decided to evacuate the cyst under gas and oxygen anæsthesia. The patient had died under the anæsthetic before anything was attempted. *Post mortem* examination revealed enlargement of the heart and aorta and old inflammation of the aortic valves. There was a collection of encysted fluid in the left side of the chest, no hydatid elements were found. The spleen was small and surrounded by dense adhesions. The peritoneal cavity contained about a pint of straw coloured fluid. Dr. Hurley held that, in spite of the absence of reaction to the Wassermann test, syphilis was the only diagnosis which would account for the myocarditis, the aortitis, the enlarged glands in the neck, the mass in the spleen which had disappeared, and the comparatively long illness extending over three years with exacerbations and improvements. He commented on the rarity of sacculated fluid in the chest in heart failure and the fact that no hydatid had been found in spite of reactions to hydatid tests on two occasions. He also asked whether straw coloured fluid could occur in an uninfected hydatid which had not been previously explored by a needle.

DR. S. V. SEWELL said that he had seen a straw coloured pleural effusion complicating a pulmonary hydatid. One patient with multiple cerebral tumours had given a reaction to the Casoni test, but had reacted similarly to injections of saline solution and a number of other substances.

DR. K. D. FAIRLEY said that in his experience the delayed Casoni reaction was very reliable. The result of the complement fixation test remained positive for only a short time after operation, but the result of the Casoni test might remain positive for years.

MR. VICTOR HURLEY said that he had seen failure of reaction to the Casoni test in a patient with a hydatid cyst which at operation was hard and irregular.

MR. ALAN NEWTON mentioned two cases in which at operation no hydatid was found, in both of which reactions to the Casoni test had been obtained.

König's Disease.

Dr. Hurley's second patient was a female, aged twenty-four, who five years previously had fallen and injured her right knee. During the following twelve months the joint had been intermittently swollen and painful. An examination at that time revealed considerable swelling and limitation of movement in the joint. X ray examination had revealed on the caudal surface of the internal condyle of the femur a small depression about one centimetre long which was occupied by a crescentic piece of bone; this appeared almost to have separated from the femur. Two months later another X ray picture had been taken and the small piece of bone had separated and could be seen occupying a position in the suprapatellar bursa. The joint had been rested for two months on a back splint in the hope that the detached fragment would become fixed away from the joint line. Since then, for a period of four years, the joint had given no further trouble and at the time of the meeting no abnormality was found on ordinary physical examination. An X ray photograph, however showed that the small detached piece of bone had increased to several times its former size and was occupying a position in the posterior aspect of the joint and in the joint line. Dr. Hurley commented on the increase in the size of the foreign body and also on the absence of chronic inflammatory changes in the joint.

MR. ALAN NEWTON said that the foreign body would probably continue to increase in size and would later give rise to symptoms. When this happened it should be removed.

Correspondence.

LEPROSY.

SIR: In Dr. Molesworth's paper upon leprosy which appeared in THE MEDICAL JOURNAL OF AUSTRALIA for September 18, there is a reference to the curiously rapid disappearance of leprosy in the sixteenth century and the coincidence of its disappearance with the arrival of syphilis on the scene.

Many years ago I read an article in an old book, dated perhaps about 1804, which I found upon the shelves of the Johnsonian Club of this city. Its title was something like this: "Transactions of the Philosophical Society." The article was by a medical man and it drew attention to the probable cause of the emptying of the lazarettes for leprosy which then existed in many places in England. At the time of his writing apparently these institutions were already emptying. The author of the paper declared that this was directly due to the work, then recent, of John Hunter in establishing the diagnosis of syphilis. Am I right in saying that John Hunter's work on this subject was recorded about 1786?

It would appear, as far as I can recollect the substance of the article I refer to, that in a period of about eighteen or twenty years Hunter's work put the final touch on the abolition of lepers in the lazarettes of England.

In the seventeenth century medical men in England were aware of the existence of the disease, syphilis, and it was

this knowledge which began to reduce the incidence of so-called leprosy in England to which Dr. Molesworth refers.

I regret very much that a recent visit to the Johnsonian revealed to me the fact that the book from which I gathered this information many years ago, has now disappeared from the shelves of the Club. It is also somewhat shocking to find after searching several encyclopædias on the subject that there is no mention of the heroic sacrifices made by John Hunter and a number of his students in allowing themselves to be inoculated with this disagreeable disease in the pursuit of knowledge. Truly the grass grows quickly over the graves of the masters!

Yours, etc.,

E. SANDFORD JACKSON, M.B., Ch.B.

St. Helen's Hospital, South Brisbane,
October 15, 1926.

STING RAY INJURIES.

SIR: The letter of Dr. Burgess published in your issue of October 2 *re* the injury produced by sting ray recalls to my mind a girl I attended last summer.

She was carried from the beach to my house, a distance of a couple of hundred yards, having been stung on the foot whilst swimming. There was a small bayonet-shaped puncture on the dorsum of the right foot; the patient was suffering great pain which she complained of as extending up to the knee. Her face was pale and the pulse rate over 100 per minute.

I made one or two incisions with a scalpel through the skin and placed the foot in a bucket of hot hypertonic salt solution and a rubber bandage on the thigh. This encouraged bleeding and in about an hour the pain was relieved and she was able to return home.

She stated that she had been stung by a sting ray. I have lived on the beach at Brighton for thirty years and have bathed almost continuously daily, but this is the only time I ever saw a sting ray injury. I think the treatment is to incise and encourage hæmorrhage.

Yours, etc.,

PAUL G. DANE.

61, Collins Street, Melbourne,
Undated.

THE WEIGHT OF AUSTRALIAN BABIES.

SIR: Your issue of October 9, 1926, contains a paper by Dr. Southby giving figures *re* weight of Australian (really Victorian infants which in part bear out results previously known and published, but at the same time I think the figures are from too small a number to be reliable for statistical purposes. I would refer to a very much larger series published in the *Australian Medical Journal*, November 15, 1887, which show how a big alteration did occur in a series of two thousand cases due to economic reasons.

Yours, etc.,

R. H. FETHERSTON.

14, Collins Street, Melbourne.
October 14, 1926.

CHILBLAINS.

SIR: *Re* Dr. L. J. C. Mitchell's note on a new mode of treating chilblains, by elastic pressure.

Dr. Mitchell will find that if he orders his patients to immerse the affected parts in equal parts of ten volumes hydrogen peroxide and hot, boiled water for twenty minutes twice daily, their chilblains will be promptly cured.

Some of my patients are unorthodox and develope chilblains on the tip of the nose, where local elastic pressure would be impossible for cosmetic and topographical reasons.

If the chilblains are not suppurating carron oil should be applied, but if suppurating "Chinosol" foments are indicated. In those who have reached the fool or the physician age, a purin-free diet with liniment methyl salicyl to be rubbed in and a good liver mixture are indicated.

Yours, etc.,

ARTHUR WATKINS.

Griffith, New South Wales,
October 11, 1926.

A CURIOSITY.

SIR: The enclosed, received by a colleague, may be of interest to your readers.

Yours, etc.,

J. C. WINDEYER.

The University of Sydney,
October 22, 1926.

DEAR SIR: I would like to know if it is known whether the sex of a child is known before the child is born, as I am able to tell the sex of the first child after male and female are married.

I remain,
Yours sincerely,

Obituary.

ERNEST GREGORY BLAXLAND.

WE regret to announce the death of Dr. Ernest Gregory Blaxland which occurred at Cronulla, New South Wales, on November 2, 1926.

CORRIGENDUM.

OUR attention has been drawn to a typographical error which was allowed to pass in the leading article on prenatal supervision published in THE MEDICAL JOURNAL OF AUSTRALIA of October 9, 1926, page 489. The statement that the maternal mortality from all puerperal causes has varied around 5% should have been corrected to 5‰. According to the Commonwealth Statistician the maternal mortality rate from all puerperal causes in 1924 was 5·47‰.

Proceedings of the Australian Medical Boards.

QUEENSLAND.

THE undermentioned have been registered under the provisions of *The Medical Act* of 1925, as duly qualified medical practitioners:

Bennett, Aubrey George, M.B., Ch.M., 1925 (Univ. Sydney), Camooweal.
Emmett, John Albert, M.B., Ch.M., 1925 (Univ. Sydney), Mount Morgan.
Henderson, Robert John Arnold, M.B., B.S., 1925 (Univ. Melbourne), Mitchell.
McGregor, Roy Stanley, M.B., Ch.M., 1913 (Univ. Sydney), Beenleigh.
Piscitelli, Francesco, M.D., 1924 (Univ. Naples), Brisbane.
Sinclair, William Malcolm, M.B., B.S., 1911 (Univ. Adelaide), Toowoomba.
East, Alan Robert, M.B., Ch.M., 1926 (Univ. Sydney), Brisbane.
Maxwell, Roy Allan, M.B., Ch.M., 1926 (Univ. Sydney), Brisbane.
O'Sullivan, Emil John, M.B., Ch.M., 1926 (Univ. Sydney), Brisbane.

Restoration to Register.

O'Flynn, Jerome, M.B., Ch.B., 1913 (N. Univ. Ireland).

NEW SOUTH WALES.

THE undermentioned have been registered under the provisions of *The Medical Act*, 1912 and 1915, as duly qualified medical practitioners:

Claridge, Henry Arthur Herbert, M.B., B.S., 1892 (Univ. Durham), 49, Cambridge Street, Stanmore.

Fielden, Frederick Ernest, L.S.A., 1900 (Lond.), L.M.S.S.A., 1907 (Lond.), c.o. Union Bank of Australia, Pitt Street, Sydney.

Fraser, Louis Mansel, M.B., Ch.M., 1926 (Univ. Sydney).

King, Edgar Samuel John, M.B., B.S., 1923 (Univ. Melbourne).

Stocks, Alfred William John, M.B., Ch.M., 1926 (Univ. Sydney), c.o. A.M.P. Society, Young.

For Additional Registration.

Abbott, Joseph Henry, Ch.M., 1926 (Univ. Sydney).

Abdullah, Anthony Dominic, Ch.M., 1926 (Univ. Sydney).

Anderson, Leighton Rowland, Ch.M., 1926 (Univ. Sydney).

Baker, Joseph Roy, Ch.M., 1926 (Univ. Sydney).

Black, John Rowland, Ch.M., 1926 (Univ. Sydney).

Bolger, Thomas Natal, Ch.M., 1926 (Univ. Sydney).

Collins, Kevin James, Ch.M., 1926 (Univ. Sydney).

Croft, Roy Wood, Ch.M., 1926 (Univ. Sydney).

Forster, Cameron McDougall, Ch.M., 1926 (Univ. Sydney).

Geaney, Norman, Ch.M., 1926 (Univ. Sydney).

Graham, Colin Spencer, Ch.M., 1926 (Univ. Sydney).

Healy, Jean Florence Hamilton, Ch.M., 1926 (Univ. Sydney).

Horniman, Robert Vicary, Ch.M., 1926 (Univ. Sydney).

Hughes, Norman William Michael, Ch.M., 1926 (Univ. Sydney).

James, Stanley George, Ch.M., 1926 (Univ. Sydney).

Little, Harry Bennett, Ch.M., 1926 (Univ. Sydney).

Longworth, Roland Edward, Ch.M., 1926 (Univ. Sydney).

McHardy, Charles Alister, Ch.M., 1926 (Univ. Sydney).

Marshman, Eric Ambrose Claude, Ch.M., 1926 (Univ. Sydney).

Peck, Grace Jean, Ch.M., 1926 (Univ. Sydney).

Potiris, Michael, Ch.M., 1926 (Univ. Sydney).

Punch, Francis Michael Greenway, Ch.M., 1926 (Univ. Sydney).

Robertson, Fanny Croaker, Ch.M., 1926 (Univ. Sydney).

Shannon, James Robert, Ch.M., 1926 (Univ. Sydney).

Shappere, Arthur Joseph, Ch.M., 1926 (Univ. Sydney).

Spark, Robin James Hester, Ch.M., 1926 (Univ. Sydney).

Taylor, Hugh Carlyle, Ch.M., 1926 (Univ. Sydney).

Thomson, Vida Mary, Ch.M., 1926 (Univ. Sydney).

Walker, Jack Frederick, Ch.M., 1926 (Univ. Sydney).

Wheelihan, John Maurice, Ch.M., 1926 (Univ. Sydney).

Wilkinson, Frederick Osborne Bushby, Ch.M., 1926 (Univ. Sydney).

Books Received.

PRACTICAL MATERIA MEDICA AND PRESCRIPTION WRITING, by Oscar W. Bethea, M.D., Ph.G., F.C.S.; Fourth Revised Edition; 1926. Philadelphia: F. A. Davis Company. Royal 8vo., pp. 508. Price: $4·50 net. $3·00 net.

Medical Appointments Vacant, etc.

FOR announcements of medical appointments vacant, assistants. *locum tenentes* sought, etc., see "Advertiser," page xx.

RAILWAY CONSTRUCTION WORKS, NORTHERN TERRITORY: Medical Officer.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 30 - 34, Elizabeth Street, Sydney.	Australian Natives' Association. Ashfield and District Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham Dispensary. Manchester United Oddfellows' Medical Institute, Elizabeth Street, Sydney. Marrickville United Friendly Societies' Dispensary. North Sydney United Friendly Societies. People's Prudential Benefit Society. Phœnix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association Proprietary, Limited. Mutual National Provident Club. National Provident Association.
QUEENSLAND: Honorary Secretary B.M.A. Building, Adelaide Street, Brisbane.	Members accepting appointments as medical officers of country hospitals in Queensland are advised to submit a copy of their agreement to the Council before signing. Brisbane United Friendly Society Institute. Stannary Hills Hospital.
SOUTH AUSTRALIAN: Honorary Secretary, 12, North Terrace, Adelaide.	Contract Practice Appointments at Ceduna, Wudinna (Central Eyre's Peninsula), Murat Bay and other West Coast of South Australia Districts.
WESTERN AUSTRALIAN: Honorary Secretary, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
NEW ZEALAND (WELLINGTON DIVISION): Honorary Secretary, Wellington.	Friendly Society Lodges, Wellington, New Zealand.

Diary for the Month.

Nov. 13.—Victorian Branch, B.M.A.: Annual Conference.
Nov. 15.—New South Wales Branch, B.M.A.: Organization and Science Committee.
Nov. 16.—Tasmanian Branch, B.M.A.: Council.
Nov. 16.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
Nov. 17.—Western Australian Branch, B.M.A.: Branch.
Nov. 17.—Central Northern Medical Association, New South Wales.
Nov. 17.—Section of Obstetrics and Gynæcology, New South Wales Branch, B.M.A.
Nov. 18.—Section of Neurology and Psychiatry, New South Wales Branch, B.M.A.
Nov. 23.—New South Wales Branch, B.M.A.: Medical Politics Committe

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

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